Final Report

Evaluation of the Non-Residential Smart $aver® Prescriptive Program in North and South Carolina

Results of a Process and Impact Evaluation

Prepared for
Duke Energy

139 East Fourth Street
Cincinnati, OH 45201

Final: February 6, 2011
Revised: June 16, 2011

Prepared by:
Nick Hall, Brian Evans and John Wiedenhoeft

TecMarket Works
165 West Netherwood Road, Suite A
Oregon, WI 53575
Voice: (608) 835-8855
Fax: (608) 835-9490
Mail@TecMarket.net

Pete Jacobs

BuildingMetrics Inc.
2540 Frontier Ave
Boulder, CO 80301
Voice: (303) 459-7411
Fax: (608) 835-9490
pjacobs@buildingmetrics.biz

Table of Contents

June 16, 2011: *This report has been revised. The original version of this report used measure savings estimates based on DSMore program planning projections from 2008. This version of the report uses the most current (2010) savings projections. The update affects the measure savings realization rates and the total program projected savings. The changes affect Table ES-1 through Table ES-3, Table 1 through Table 4, and Table 16 through Table 26. References to the realization rates in the text were updated consistent with the values in the updated tables.*

The 2010 DSMore savings projections include HVAC interactive effects. Footnotes 6 and 7 were revised to include mention of HVAC interactive effects. A section describing

the development of HVAC interactive effects multipliers (called "waste heat factors") was added to the report starting on page 59. A new Table (Table 15) was added that lists the waste heat factors derived for this study.

The realization rates for Eligible Fixtures Only shown in Tables 18 and 19 were revised for North Carolina site 16 and South Carolina site 3. The evaluated savings were set to zero for these sites.

The effective useful life for Other lighting measures in Table 24 was revised from 12 years to 10 years to better represent the mix of lighting measures in the Other lighting category.

Executive Summary

Summary of Findings

This Executive Summary provides an overview of the key findings identified through this evaluation.

Significant Process Evaluation Findings

- The trade allies and commercial customers would like to have the prescriptive program application process available online. This would make the program operate more smoothly for both Duke Energy staff and the Smart $aver® partnering trade allies and would speed accessibility to the participation process and eliminate problems with obtaining hard-copy application forms and transmitting them via fax.

- The trade allies would like an increase in collaborative marketing between Duke Energy and the trade allies to raise awareness of the program. To achieve this they suggested that Duke Energy provide more literature on the program to the trade allies and to a list of targeted contacts supplied by trade allies. Several trade allies also would like to see Duke Energy initiate a preferred vendor program for the Non-Residential Smart $aver® Program.

Significant Impact Evaluation Findings

- Even though these algorithms are not the source of record for program impact calculations, the measure savings algorithms in the third-party program tracking database contain errors. Program accomplishments should be tracked using measure counts from the program tracking database and unit energy savings from program design calculations contained within DSMore until the errors can be corrected. Duke Energy was aware of this problem, and steps will be taken to correct this issue.

- Customer self-reported fixture watts for new and replaced fixtures are inconsistently reported and proving to be unreliable. We suggest removing this information from the applications to reduce customer burden.

- Energy and demand savings realization rates for kWh and kW for high bay lighting were very close to 1.0, indicating the program planning estimates provide a good indication of average high bay lighting participant savings.

A summary of the impact findings is presented in the standardized Duke Energy Program Impact Metrics Tables below. Table ES-3 presents total fixtures across both states as well as weighted averages for the “per fixture” savings metrics. North and South Carolina are weighted at 65% and 35% respectively. This distribution reflects the quantity of fixtures in each state as compared to the total from both.

Table ES-1 Program Impact Metrics Summary for North Carolina

Metric	Result
Number of Program Participants from 6-1-2009 to 4-30-2010	23,600 fixtures
Gross kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.098
High Bay 3L T-5 High Output	0.148
High Bay 4L T-5 High Output	0.307
High Bay 6L T-5 High Output	0.147
High Bay 8L T-5 High Output	0.498
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.197
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.318
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.214
Gross kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	578
High Bay 3L T-5 High Output	867
High Bay 4L T-5 High Output	1,799
High Bay 6L T-5 High Output	859
High Bay 8L T-5 High Output	2,924
High Bay Fluorescent 4 Lamp (F32 Watt T8)	1,157
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,863
High Bay Fluorescent 8 Lamp (F32 Watt T8)	1,253
Gross therms per fixture	N/A
Freeridership rate	30%
Spillover rate	
Self Selection and False Response rate	
Total Discounting to be applied to Gross values	30%
Net kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.069
High Bay 3L T-5 High Output	0.104
High Bay 4L T-5 High Output	0.215
High Bay 6L T-5 High Output	0.103
High Bay 8L T-5 High Output	0.349
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.138
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.223
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.150
Net kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	405
High Bay 3L T-5 High Output	607
High Bay 4L T-5 High Output	1,259
High Bay 6L T-5 High Output	601
High Bay 8L T-5 High Output	2,047
High Bay Fluorescent 4 Lamp (F32 Watt T8)	810
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,304
High Bay Fluorescent 8 Lamp (F32 Watt T8)	877
Net therms per fixture	N/A
Measure Life	10

Table ES-2 Program Impact Metrics Summary for South Carolina

Metric	Result
Number of Program Participants from 6-1-2009 to 4-30-2010	12,615 fixtures
Gross kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.088

Metric	Result
High Bay 3L T-5 High Output	0.132
High Bay 4L T-5 High Output	0.274
High Bay 6L T-5 High Output	0.131
High Bay 8L T-5 High Output	0.446
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.176
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.284
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.191
Gross kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	530
High Bay 3L T-5 High Output	795
High Bay 4L T-5 High Output	1,650
High Bay 6L T-5 High Output	788
High Bay 8L T-5 High Output	2,681
High Bay Fluorescent 4 Lamp (F32 Watt T8)	1,060
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,709
High Bay Fluorescent 8 Lamp (F32 Watt T8)	1,149
Gross therms per fixture	N/A
Freeridership rate	30%
Spillover rate	
Self Selection and False Response rate	
Total Discounting to be applied to Gross values	30%
Net kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.062
High Bay 3L T-5 High Output	0.092
High Bay 4L T-5 High Output	0.192
High Bay 6L T-5 High Output	0.092
High Bay 8L T-5 High Output	0.312
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.123
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.199
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.134
Net kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	371
High Bay 3L T-5 High Output	557
High Bay 4L T-5 High Output	1,155
High Bay 6L T-5 High Output	552
High Bay 8L T-5 High Output	1,877
High Bay Fluorescent 4 Lamp (F32 Watt T8)	742
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,196
High Bay Fluorescent 8 Lamp (F32 Watt T8)	804
Net therms per fixture	N/A
Measure Life	10

Table ES-3 Program Impact Metrics Summary for North and South Carolina

Metric	Result
Number of Program Participants from 6-1-2009 to 4-30-2010	36,215 fixtures
Gross kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.095
High Bay 3L T-5 High Output	0.143
High Bay 4L T-5 High Output	0.296
High Bay 6L T-5 High Output	0.141
High Bay 8L T-5 High Output	0.481
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.190

Metric	Result
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.306
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.206
Gross kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	561
High Bay 3L T-5 High Output	843
High Bay 4L T-5 High Output	1748
High Bay 6L T-5 High Output	835
High Bay 8L T-5 High Output	2842
High Bay Fluorescent 4 Lamp (F32 Watt T8)	1124
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1811
High Bay Fluorescent 8 Lamp (F32 Watt T8)	1218
Gross therms per fixture	N/A
Freeridership rate	30%
Spillover rate	
Self Selection and False Response rate	
Total Discounting to be applied to Gross values	30%
Net kW per fixture	kW/fixture
High Bay 2L T-5 High Output	0.067
High Bay 3L T-5 High Output	0.100
High Bay 4L T-5 High Output	0.207
High Bay 6L T-5 High Output	0.099
High Bay 8L T-5 High Output	0.337
High Bay Fluorescent 4 Lamp (F32 Watt T8)	0.133
High Bay Fluorescent 6 Lamp (F32 Watt T8)	0.214
High Bay Fluorescent 8 Lamp (F32 Watt T8)	0.144
Net kWh per fixture	kWh/fixture
High Bay 2L T-5 High Output	393
High Bay 3L T-5 High Output	590
High Bay 4L T-5 High Output	1,224
High Bay 6L T-5 High Output	585
High Bay 8L T-5 High Output	1,989
High Bay Fluorescent 4 Lamp (F32 Watt T8)	787
High Bay Fluorescent 6 Lamp (F32 Watt T8)	1,268
High Bay Fluorescent 8 Lamp (F32 Watt T8)	853
Net therms per fixture	N/A
Measure Life	10

Recommendations

1. Evaluate the usefulness of a possible training webinar. Consider recording a webinar for future web access. A webinar may prove to be a benefit only if it is offered live, with a live question and answer period.

2. Explore the effectiveness of email and electronic campaigns and survey trade allies to determine the frequency with which they prefer to be contacted. Reports from the field suggest that trade allies may prefer the less-expensive email campaigns over mailed materials. This may allow the Non Res Smart $aver® to have a broader reach at a lower cost.

3. Duke Energy should consider the feasibility of providing more case studies on customers who have implemented energy efficiency projects using high-priority

high-impact measures in program materials provided to trade allies for them to share with their customers. Duke Energy may wish to include case studies on customers from several market segments. If built correctly, such case studies would increase the understanding of the Smart $aver® program by customers in different market segments because they would have examples to which they can relate, lowering the perceived risk and uncertainty for new participants.

4. Duke Energy should explore the feasibility of developing a coordinated marketing campaign for one market segment, implementing it as a pilot, and evaluating its effectiveness. A small pilot would allow Duke Energy to assess whether targeting marketing to one segment would be a more effective approach for future program efforts.

5. Duke Energy and WECC should jointly share and discuss their technology selection processes. This would allow both parties to better provide feedback in order to make accurate estimates of market activity. This would also allow both Duke Energy and WECC to explain, if the trade allies ask, why certain technologies are not included.

6. WECC should provide timely feedback to Duke Energy about whether they believe the projected market activity levels provided by Duke Energy are realistic, based upon WECC's experience in the field. This would allow Duke Energy to use WECC's direct experience in the field to relay any upcoming customer purchasing trends.

7. If poor economic conditions are expected to impact customers' ability to take on retrofit projects, and if there is enough spread among the energy efficiency levels of equipment available to make offering multiple levels of efficiency a viable option, Duke Energy should assess whether it is feasible to test a tiered prescriptive program that would allow customers to still install energy efficient technologies when the highest efficiency models are priced out of their current means. However, Duke Energy should not trade off higher levels of free ridership in exchange for increased participation in a program that achieves lower levels of energy savings. It is possible that cost per achieved net kWh would be increased under such an offer depending on how the market would respond.

8. Explore whether it is feasible to create marketing and outreach campaigns that focus on lifecycle costs. This may allow customers to look beyond consideration about a measure's capital cost and its incentive, and understand the energy savings that would be delivered over the measure's effective useful life.

9. Make the template for itemizing invoices available online. This guidance would allow trade allies and customers to send in more accurate applications that would be rejected less frequently and could be processed more quickly and cost effectively, without WECC needing to contact applicants for missing information.

10. Duke Energy should consider conducting usability studies and satisfaction surveys of the online application process. This may allow Duke Energy to quantify any reduction in application speed and any increase in customer satisfaction with the application process.

11. Duke Energy should consider the feasibility of designing, implementing, and evaluating a pilot program to help <500 kW customers to prioritize energy efficient projects. This may allow more Duke Energy customers to achieve greater savings by providing them with a more complete picture of their energy efficiency options.

12. Duke Energy should consider the potential benefits of increased market segment penetration if marketing were structured to specifically focus on barriers for a particular key market segment. Duke Energy may want to do this by identifying one high priority market and conducting a characterization study about that market. Duke Energy might then identify that market's specific barriers to participation and develop a logic model that specifies a strategic approach toward overcoming those barriers. Duke Energy can then evaluate the effectiveness of the approach at the end of the program cycle. This would allow Duke Energy to see if they would be able to successfully drive greater activity in a particular segment if there arose a need for doing so in the future.

Introduction

This report presents the results of a process and impact evaluation of the Non-Residential Prescriptive Smart $aver® Program in North and South Carolina.

Program Description

The Non-Residential Smart $aver® Prescriptive program seeks to reward businesses for saving energy by providing rebate incentives to install qualifying high-efficiency lighting, cooling or motors/pumps. Duke Energy's commercial and industrial customers fund this program by paying an energy efficiency rider based upon their kWh usage. The program has a custom component as well as the prescriptive component. This process evaluation study looks at the prescriptive program only. The custom program will not be evaluated here, but it works hand in hand with the prescriptive program. In the prescriptive program, customers may install selected energy efficient measures and then send in an application for rebates, up to 60 days after the installation. Energy efficiency measures that are not part of the prescriptive program may still earn a rebate, but the installation of these custom measures must first be approved by Duke Energy through an application process. Along with the Non Res Smart $aver® program, there is also a Residential Smart $aver® program that mainly involves prescriptive lighting and HVAC measures.

The prescriptive Non Res Smart $aver® program was initially started as a limited-funds program that used ratepayer money. When the funds were depleted, the program ended. That has now been changed to an unlimited funds program because Duke Energy is allowed to reclaim program costs.

About This Report

This report presents the results of a process and impact evaluation of Duke Energy's Non-Residential Smart $aver® Program in North and South Carolina. The Smart $aver® Program provides incentives to customers to upgrade to energy efficient lighting and commercial equipment. The study focuses on participants from program year 2009.

In order to better understand the program's operations and to identify possible areas of improvement, the evaluation team conducted nine in depth interviews with staff from Duke Energy, the Wisconsin Energy Conservation Corporation (WECC), and a technical consulting team.

This effort employed interviews with program trade allies and a survey of commercial customers using the program. To conduct the process evaluation we interviewed five trade allies and surveyed twenty program participants regarding twenty-five program measures. Contacts were selected randomly from the full population of trade allies and participants.

The second section provides findings from the impact evaluation efforts. The impact evaluation employed a tracking system review, onsite surveys and short term Measurement and Verification (M&V) of selected lighting fixtures using light loggers.

Process Evaluation

In order to better understand the program's operations and to identify possible areas of improvement, the evaluation team conducted nine in depth interviews with staff from Duke Energy, the Wisconsin Energy Conservation Corporation (WECC), and a technical consulting team. The results of these interviews follow.

Program Objectives

The program staff who were interviewed all were able to describe some of the multiple goals of the program.

- "Get as much participation as possible…get impacts so Duke will not have to build more power plants"
- "Drive the market toward more efficient solutions and applications"
- "Help through incentives to bring different and newer technologies to the market place.
- "To create sustainable energy savings within customer's facilities."
- "Lower the kW demand on their system."

Roles

Duke Energy
Duke Energy serves as the administrator of this program with WECC playing a key role in implementation. WECC processes applications, issues incentive checks, conducts installation verifications, and grows a network of vendors and trade allies who implement energy efficiency projects for the commercial and industrial customers. Duke Energy guides the strategic direction of the program using internal research as well as feedback from WECC. A technical consulting firm is brought into calculate program cost effectiveness, incentive levels, and projected market penetration.

WECC
WECC's development of a trade ally network relies upon the efforts of WECC's trade ally representatives. These WECC employees have program responsibilities in four areas: 1) physical meetings and outreach with vendors and trade allies, 2) recruitment of trade allies and vendors, 3) work with participating vendors to figure out the best energy efficiency project for specific customers, and 4) conduct physical verifications of measure installations[1].

WECC's Outreach Process

[1] There is some discrepancy in the use of the term "trade ally". Duke Energy uses "trade ally" to refer to WECC and "vendor" to refer to the distributors and sales people. WECC uses "trade ally" to refer to the distributors and vendors, and refer to themselves as trade ally representatives.

The WECC trade ally reps use a variety of tactics to conduct outreach. They look for opportunities in which they can actively promote the Smart $aver® program. For example, one tactic some trade ally reps use is to try to meet with a distributor's sales force, in order to speak to as many people as once. Another rep mentioned that he would like to take advantage of more speaking opportunities such as the ones that are available at the chamber of commerce meetings.

> *"I look for opportunities to speak, see who is currently participating in the program and make sure they have a good experience and continue"*
>
> *"[I] touch base with new trade allies and see if they want me to come by and see them or if they have it under control."*

They see their responsibility as being able to provide any help necessary to trade allies who are filling out applications. *"When a trade ally is filling out an application, or has general questions, or wants to sign up, we drop what we're doing. The trade allies are our first and foremost priority."* Common questions from TAs include asking whether a particular customer or project is eligible and asking about the status of a check. WECC believes that the quickest and most cost effective way to get applications is to have the trade allies engaged. *"If your trades are not promoting the program, it's not on the mind of the customers.*

WECC recruits trade allies in a targeted approach: Duke Energy provides a list of trade ally prospects and the WECC trade ally reps' goals are based on the number of vendors they can recruit off that list. Recently, WECC was directed to place a higher priority on recruiting trade allies who have higher impact technologies such as HVAC and motors. This new focus will be discussed in detail later in this report. WECC keeps a scorecard on trade ally communications, applications, and recruitments. This is shared at the weekly conference call between Duke Energy and WECC. WECC management also conducts quarterly reviews with the trade ally reps. WECC management does "ride alongs" with the trade ally reps in order to provide feedback on issues such as the quality of their presentation, their product knowledge, and the number and quality of the calls they are making.

Trade Allies

A trade ally rep reported that there is currently no formal training for the trade allies. There previously was a training program but it was cancelled for reasons unknown to the rep. The rep would prefer to have a formal training program. "*We spend so much time reinventing the wheel with new trade allies"* The current informal process uses PowerPoint presentations that were developed by Duke Energy, and WECC only uses materials that have been approved by Duke.

Duke Energy has also designed brochures to promote the program, and WECC provided input to the design. One brochure is shared by Ohio and the Carolinas. WECC reported that the brochure and PowerPoint presentations are well received by the trade allies: "*The materials are great"*. The WECC trade ally reps have also trained the vendors to go to

the Non Res Smart $aver® website as the number one source of updated information. "*They know to go there and look for information*." WECC also promotes a "1-800" number to a call center that handles program questions.

Duke Energy also facilitated a series of trade ally roundtables in both Ohio and the Carolinas in order to obtain feedback about the Non Res Smart $aver® program. The number one request made by the trade allies was to receive more help understanding how Duke Energy's rates are applied and how to calculate impacts and payback periods for the customers. In response to this feedback, Duke Energy is developing a series of webinars to train trade allies to be able to demonstrate the value proposition of energy efficiency measures in project proposals for the customers. The trade allies had been using an average rate to calculate payback, and the customers hold the trade allies responsible for any incorrect estimates.

RECOMMENDATION: Evaluate the usefulness of the training webinar. Consider recording the webinar for future web access, and develop guidelines for calculating impacts for different rates. The webinar may prove to be a benefit only if it is offered live, with a live question and answer period.

The trade allies for the Non Res Smart $aver® program currently receive no incentives from participation "There is no incentive for the trade ally to help a customer fill out an application or pull up an invoice, pull a specification sheet and submit an application." In many cases, the trade ally representatives must spend a significant amount of time helping customers with application paperwork. They are motivated to participate when the proposal represents a large job and the sales contract relies upon the Smart $aver® incentive being factored into the proposal. The trade ally representatives try to convey to the TAs that the more projects they are involved with, the higher chance they will have for up-selling customers to higher premium energy efficient equipment. Duke Energy believes that once the vendors are educated, they do understand the value proposition that the Non Res Smart $aver® incentives represent, particularly since energy efficiency products tend to have higher profit margins "*so it's win-win all the way around*".

So far, this is enough motivation to have driven the Non Res Smart $aver® program's current level of success. However, the issue of trade ally incentives was frequently mentioned by WECC's trade ally representatives because they also serve the trade allies for the Residential Smart $aver® program. The Res Smart $aver® program is *"wildly exceeding application goals"* because the residential trade allies are given incentives for each application. This discrepancy does have implications for the Non Res Smart $aver® program, and the issue of paying trade allies incentives will be discussed in detail later in the report.

Technical consultant team

Duke Energy uses a team of technical consultants including Morgan Marketing Partners that handles the DSMore analyses that provides incentive levels and estimates cost effectiveness, Architectural Energy Corporation that handles DOE2 modeling, and Franklin Energy, that does engineering calculations for non-weather sensitive measures.

Call Center

Duke Energy provides a 1-800 number for the Non Res Smart $aver® program. The call center is operated by CustomerLink, a third party company. They answer general program questions while technical questions are directed to WECC.

Collaboration and Communications

Duke Energy and WECC collaborate well and communicate frequently about the program. Duke Energy, WECC, and CustomerLink formally hold weekly conference calls to discuss feedback from the customers, and informally have more frequent calls to address specific issues as they arise. "*We have very frequent communication, it's very open*" stated a WECC manager.

One issue that interviewees frequently raised is fact that WECC and Duke Energy have different performance objectives. WECC's objectives are determined by their contract with Duke Energy and in that contract, WECC is currently paid per application. Duke Energy, however, is compensated on the basis of kW and kWh saved and avoided costs. This has been acknowledged as a problem by both sides, particularly as Duke Energy wishes to achieve deeper energy savings with higher impact measures that require more of a sell to customers because of their greater expense. Duke and WECC have already started discussions about changing the contract so that WECC's performance objectives are aligned with those of Duke Energy, and they hope to resolve this issue soon.

Currently, when WECC identifies an issue that needs improvement, they believe that Duke Energy calls on a third party consultant, Franklin Energy, for strategic input before making a decision[2]. WECC implements turnkey energy efficiency programs for other utility clients and they are accustomed to providing advice on strategic planning and program design. WECC believes that they have the expertise to help with the Non Res Smart $aver®, but the current contract prohibits them from doing so. The working relationship between Duke Energy and WECC is operating well, and both parties actively work to address any issues that affect the efficiency of the program's operations. However, WECC seems uncertain about how much ownership Duke Energy wants them to have over the work they do. One WECC trade ally rep mentioned that Duke Energy is very quick to point out that Duke Energy runs the program, and "t*here is very little mention of WECC when I go out with Duke*". The same trade ally said that it doesn't stop WECC from trying to provide value. "*I don't know how Duke values WECC. My thought has been, that the more you do, the more value you're getting to Duke…I'm always analyzing what we could be doing better*." There may be regulatory accountability reasons for needing to make clear that Duke Energy runs the program, but in front of customers, it would be very important to make clear that WECC is a trusted partner in this effort, particularly if WECC has responsibility for helping to provide estimates of energy savings.

[2] In actuality, Franklin Energy is part of a team of technical consultants and they do not provide advice on program strategy or communications strategy

RECOMMENDATION: Duke Energy should make sure that WECC's key role in implementation is acknowledged to the customers. Duke Energy's clear acknowledgement of WECC's expertise in this field would help assure prospective trade allies and customers that they would be working with experienced advisors who would be able to help them resolve any barriers they might come across

Communications to Program Participants

The Non Res Smart $aver® program has two categories of participants: the vendors or "trade allies", and the end use customer. One WECC trade ally rep stated that the program was initially designed so that WECC talks to the vendors while Duke Energy talks to their customers. WECC trade ally reps have been told that talking directly to the customers is outside WECC's scope of work. Duke Energy has since relaxed the restriction keeping WECC from talking with customers, but WECC believes that they could be much stronger advocates for Duke Energy if WECC is formally allowed to work closely with both vendors and customers. WECC believes they have the expertise and interest in working more closely with Duke Energy on this program than they are currently asked to. Duke Energy in the past has been reticent about using WECC for customer visits. If a business relationship manager (BRM) is available, then that person accompanies the contractor on the call. WECC is only asked to accompany the contractor if the BRM is not available.

WECC also reported that they are sometimes in the right place at the right time to help, but are not able to do so because of contractual boundaries. For example, Duke Energy's business relationship managers have called on WECC to ask the trade ally representatives to speak directly to customers about the program. WECC thinks the program would be more effective if they were able to work directly with the customer. WECC suggested that there may be a gap that they can fill for Duke Energy: There is a large faction of customers that don't have assigned Business Relationship Managers from Duke Energy because they are too small. WECC suggested during these interviews that they could represent these smaller customers, making sure that the customer understands that they are working on behalf of Duke Energy, but at this point WECC is not sure whether Duke Energy is receptive to this idea. One trade ally rep said that there already was "*some kind of effort*" to reach that mass market group but he was not sure what those plans are. Because these customers are not large enough to have the choice of opting out of paying the energy efficiency rider, "*they're underrepresented, there's great potential there*".

Market Research

The Non Res Smart $aver® has two types of participants, the vendors and the end use customers, and some market research is conducted on those two groups. WECC reported that they do not do any market research for this program; rather, they have to rely on Duke Energy to provide that information. In some cases, WECC trade ally representatives reported that "*Duke does not share all market research results*", or that results might have only been shared with WECC management and not with the trade ally reps. In particular, findings from market potential studies are considered proprietary.

Duke Energy incorporates the market potential and market research results into their program design considerations and WECC is informed of any necessary changes to program design. One WECC manager said that this impacts WECC directly because WECC's first year performance goals were based on the results from the market potential study. Without knowing the findings from the market potential study, WECC could only give blind agreement to the performance goals. WECC may even be able to provide a reality check on market activity estimates that arise from the market potential studies if they had access to the research findings.

RECOMMENDATION: Share market research data when other partner's need to set goals from that data. Confidentiality may be obtained by use of non-disclosure agreements between Duke Energy and WECC's key managers. Without access to this data, WECC cannot make an informed decision about whether their performance objectives are realistic. WECC may even be able to provide a reality check on market activity estimates that arise from the market potential studies, if they had access to the research findings. This would allow them to provide more value to Duke Energy.

Duke Energy does share with WECC the market research that would help trade ally recruitment and support, in particular feedback that can help WECC identify any misconceptions about the program, or inaccuracies in the use of the program. Duke Energy and WECC collaborate on the list of trade ally prospects. They use listings purchased from Dun & Bradstreet to identify large manufacturers and high volume producers. WECC's performance objectives are based on number of recruitments off that target list. Duke Energy also conducted the trade ally round tables mentioned earlier.

There is less research available on the end use customers. A Duke Energy manager reported that they currently do not have the ability to capture market segment data effectively, in terms of targeting marketing towards customer preferences; "*We don't have good* [segmentation] *data on customers*"

Marketing

WECC markets to the trade allies and vendors using a combination of brochures, website resources, cold calls, and speaking engagements. Market segmentation studies have not been conducted on the Duke Energy commercial and industrial customers, and the program currently does not formally use targeted messaging. Program staff expressed a need for this kind of research. One WECC trade ally rep mentioned that the lighting brochure that "*lists a million lighting technologies"* that is used for all trades, and suggests that brochures on lighting by specific industries would be more useful. The WECC trade allies also reported that their trade allies and vendors prefer that marketing be conducted through emails. It's difficult for vendors to find the time to travel long distances to attend meetings with the WECC trade ally representatives. Even when smaller local training workshops are held, WECC hears "*'you could have just emailed me that information, or held a webinar'…They're much more savvy with technology than we give them credit for*."

RECOMMENDATION: Explore the effectiveness of email and electronic campaigns and survey trade allies to determine the frequency with which they prefer to be contacted. Reports from the field suggest that trade allies may prefer the less-expensive email campaigns over mailed materials. This may allow the Non Res Smart $aver® to have a broader reach at a lower cost.

Duke Energy markets to the end use customer by two different channels. Brochures are distributed at trade shows and designed to raise customer awareness of the program. Duke Energy reported that this is marginally effective. Duke Energy has email marketing campaigns that are also marginally effective. "*The most effective [channel] is really the trade ally network.*" WECC stated, "*The most valuable marketing tool* [we] *have is the trade allies and* [we] *know that*. [We] *put a lot of time and energy into* [our] *trade ally network*."

Duke Energy program manager agreed: "*In the end it comes to the effectiveness of the vendor network…this is where you're going to drive* [customer] *behavior*."

The trade allies also need to market to the end use customer. One of the findings from the focus groups in the Carolinas is that the TAs in the HVAC, chillers and lighting industries were looking for calculators and case studies on end users in different market segments, to help communicate potential savings to customers. Other customer segments that trade allies were interested in include manufacturers, hospitals, and community colleges. "*We do need case studies*" for the Carolinas.

RECOMMENDATION: Develop case studies on customers who have implemented energy efficiency projects using high-priority high-impact measures. Include customers from several of market segments. This would allow customers in different market segments to have examples to which they can relate, lowering the perceived risk and uncertainty for new participants.

Coordinated marketing by WECC and Duke

A WECC trade ally representatives suggested that there has been a disconnect in trying to draw distinctions between WECC's marketing efforts to vendors and Duke Energy's marketing efforts to the end use customer. He suggested that the market should be approached on both the trade ally front and the end use customer front. "*WECC can be doing all the right things with the trade allies but can talk until they're blue in the face if* [end use customers] *are unaware of the program or if they can't buy anything due to the economy*." He suggested that Duke Energy needs to build more demand and awareness for energy efficient products with their customers. This is an oft-mentioned suggestion from WECC trade allies, and demonstrates a need either for Duke Energy to market the program more visibly to the customers, or for Duke Energy to share the effectiveness of their marketing with WECC. It is ultimately up to Duke Energy to decide how much marketing to do, and whether this program is a "demand pull" program, a "supply push" program, or a combination of both. But if Duke intends this program to be driven largely by supply push, with a greater marketing effort by the trade allies than by Duke, the program would require a different strategy in order to achieve success. We realize that

this program must be cost effective and that Duke Energy prices are low compared to the rest of the country. This low avoided cost limits program expenditures and limits what can be cost effectively accomplished. However there is a need for more effective marketing. Duke will need to determine the available additional funding margin that can be allocated to marketing, if any.

RECOMMENDATION: Duke Energy should make clear to WECC the objectives of Duke's end user marketing campaign and share progress towards those objectives. Marketing efforts would be more effective if both Duke Energy's "demand pull" and WECC's "supply push" efforts were better coordinated, for example so that the two kinds of campaigns are introduced at the same time to the marketplace.

A WECC program manager reported that in his experience, the greatest chance of an energy efficient project going through is when the costumer sees both WECC and the trade ally or utility at the table. "*Greater success when that happened, than when trade ally or utility were by themselves…Customer could look at all three of these independent groups* [working together], *the trade ally who performs the work, WECC who cuts the check, and the IOU representative who knows my business and load shape and can tell me how rates will be affected*."

There is some occasional effort to coordinate marketing right now, but it needs to be part of the program design and strategically coordinated. WECC suggested that if a particular measure, such as VFDs, is targeted as a high impact objective, then WECC's efforts should be emphasizing VFD distributors with customized seminars and training sessions. At the same time, Duke Energy should be launching a marketing effort to their customers explaining payback periods and typical costs, to build excitement and demand pull from the customers.

RECOMMENDATION: Develop a coordinated marketing campaign for one market segment, implement it as a pilot, and evaluate its effectiveness. A small pilot would allow Duke Energy to assess whether targeting marketing to one segment would be a more effective approach for future program efforts.

Applications

Every application for the Non Res Smart $aver® incentive program must be accompanied by a copy of the invoice and the spec sheet. The applications are processed by WECC's data processing center in Madison, WI, where it undergoes a review for errors.
If an error is detected on an application, either the entire application is rejected or WECC contacts the trade allies to ask them to help resolve the error. An example of an error is a missing tax ID number or a missing specifications sheet for a measure. WECC is rejecting a lot of applications due to Duke Energy's stringent requirements. One WECC trade ally rep has heard that an application error could be something "as minor as they didn't check a box".

Site Verifications and Quality Control

One of WECC's responsibilities is to verify measure installations at customer sites. The verification rate was recently changed. Initially, WECC was required to verify a random 5% of installations under $10,000, all customer self-installations over $1,000, and 100% of anything over $10,000. However, so many projects fit those criteria that the trade ally reps were effectively inspecting 8-9% of installations. This prevented the trade ally reps from spending time on outreach to prospective trade allies. Discussions are currently under way to change those inspection rates.

After the inspections are conducted, WECC enters the verification data into a database. Duke Energy requires that the original documents be kept so after entering verification data into the database, the verification worksheet is sent to storage. Spreadsheets are kept in a paper file then destroyed after one year.

In a few cases, WECC found that measures listed on the applications had not been installed. In these cases, Duke Energy went back to the trade ally and recovered the incentive payment. Duke also put the vendors on notice for future exclusion. The impacts from those installations were adjusted to account for the uninstalled measures. The Ohio trade ally rep reported that if he finds that a measure is missing, he tries to inform the customer what should be installed, and he does not note a pass or fail at that point but returns in three weeks time to verify the installs at the site again.

The trade ally reps use their discretion to determine how to verify a site at which there are too many installations to verify individually. At a site with, for example, 5,000 CFL installations, one rep reported that he would visit the site unannounced and visit various wings of the building. Duke Energy also places an emphasize safety so verifications that would pose a physical risk to the trade alley reps are not performed. In cases where installations cannot be verified because they are in an inaccessible spot, the trade ally reps must rely upon the honesty of the trade ally.

Because the WECC trade ally reps are responsible for verification of the Residential Smart $aver® installations as well as the Non Res Smart $aver® program, the high volume of activity in the Residential program also takes up verification time so that that less time is available for the Non Res Smart $aver® verifications.

Rebate Processing Operation

WECC reported that their rebate processing operation receives a lot of compliments for its speed and accuracy. Incentive checks are sent out in 2 weeks or less, and one trade ally rep reports "Customers love it when they get a check within 10 days." WECC is required to process the applications within 3 days and has been successful in meeting this very short turnaround time. This is a high performance turn-around rate.

Quality Control

Duke Energy is extremely concerned about data integrity in the application and check disbursement process, and requires a 100% accuracy level. In order to meet that requirement, WECC's quality assurance process goes through three iterations of quality

control checks, then is checked by customer account, then is sent for another round of invoice-related checks by three more staff members.

Data entry staffs' performance is tracked and reviewed for both accuracy and speed of processing. Every error is recorded, and data entry staffs undergo a quarterly review about their productivity. Quality control checks are performed every other day. If the same types of errors come up, the managers try to determine whether it's a technology issue or a training issue and rectify the situation. A WECC program manager mentioned that this requirement for 100% accuracy is extremely expensive.

Typical errors may include incorrect information on the application, mistakes in data entry, or a problem with the data upload from WECC to Duke Energy. If an error is detected, a correction measure with a negative count must be entered into the database. This provides a separate entry for the adjustment so that the original data is kept intact. The WECC data processing manager reported that errors occur infrequently, approximately 1-2 times a month.

Once an application is processed, WECC must upload the payment amount and what measures were on the application. Duke Energy has asked that the updates be as "real time" as possible, so that the records would be updated as soon as a payment is made. This rapid update makes it possible for Duke Energy's Business Relationship Managers to provide up to date information to any customers who ask about their check status. This synchronization of databases is perhaps the only difficulty for the rebate processing operation, but they report that they are in the process of coming up with a solution.

Data uploads occasionally fail due to a lost connection or timeout error but in the past there was no way to determine how much data was transmitted prior to the upload failure. The old solution was to upload the entire set of data again, check for duplicates, and then create the correction measures if there were duplicates. This was a costly time consuming process when this occurred. WECC has worked with Duke Energy to develop unique ID codes for each upload that the data processing manager believes will solve this problem in the future.

The process of transferring customer data from Duke Energy to WECC is currently a cumbersome process but the data manager did not know if any improvements were possible. Customer data is transferred using two different websites. One website is used to search for a customer by name and address, and another website is used to obtain account information. Often the data needs to be "cleaned" so that records are correctly matched, and in some cases the Duke Energy business account managers need to be involved in order to match large business customers with their multiple accounts for different buildings. However, this has not affected WECC's ability to process rebate checks to the customer in a timely manner.

During the early phases of the program, tweaks were needed to make sure that all the data needed for reporting requirements were being stored, and to make sure that data could be pulled in compliance with all the timeframes Duke Energy needed. Currently, other than

the two issues mentioned earlier, the continuing need to improve near-real-time updates to Duke Energy's database and the difficulty in getting customer data from Duke, the application processing software is working successfully and rebates are being paid on time.

This level of service comes at a cost. One WECC program manager suggested that if the 3 day requirement to process incentive applications were lengthened, there would likely be a significant reduction in administrative costs. Currently, WECC needs to maintain staffing levels large enough to handle applications as if there were a spike in application volume. "*We don't have other clients for which we maintain this level of service.*"

Technology Selection

The Non Res Smart $aver® program offers numerous technologies across five core technologies: 1) lighting, 2) HVAC, 3) motors, 4) food service, and 5) process-related equipment. Duke Energy's program manager reported that this covers about 80-90% of the activity in the marketplace. The process for selecting new technologies for the prescriptive Non Res Smart $aver® occurs once or twice a year. New measures are usually added one of two ways. The first way is if the measure is appearing frequently in the applications for the custom Non Res Smart $aver® program. The decision to roll a measure over to the prescriptive program is largely a judgment call by the Duke Energy program management. The second way is through the annual review of portfolio, conducted with the expert input of a third party technical consultant (Morgan Marketing Partners, who also generates the inputs for DSMore to determine cost effectiveness). Newly selected technologies are assimilated into the program throughout the year. Duke Energy has a lot of new technology on their radar and are thinking of doing pilots on new technologies to see how well the market accepts them.

Duke Energy explained that another factor affecting the selection of new technologies is the differing regulations regarding whether and when new technologies can be introduced. Ohio has more flexibility and will allow changes to the portfolio and to measures. Ohio is comfortable with the decisions in these areas. North Carolina, on the other hand, has very strict rules and is more restrictive in the kinds of changes that are permissible. This makes it difficult to adapt the program to reflect changes in the market.

This technology selection process is not well understood by WECC. Across the interviews, most trade ally reps have reported their various beliefs that Franklin Energy selects the technologies, tests the technologies, designs the program, and sets the incentive levels[3]. They also seem to believe that there is no process for moving custom measures over to the prescriptive program. All of these beliefs are incorrect, and suggests that Duke Energy should be more transparent about their technology selection process with their program implementer.

[3] Franklin Energy is a subcontractor that performs engineering calculations for non-weather sensitive measures. The prime contractor for the technical consulting team is Morgan Marketing Partners.

RECOMMENDATION: Duke Energy should share their technology selection process with WECC. This would allow WECC to better provide feedback to Duke about what information Duke's technical consultants need in order to make accurate estimates of market activity. This would also allow them to explain, if the trade allies ask, why certain technologies are not yet included.

The WECC trade ally representatives receive direct feedback from the vendors and trade allies about technology opportunities. One frequent suggestion from the trade allies is that common delamping measures should be added to the prescriptive Smart $aver® program. "*We hear a lot from our trades, it's a common measure that's missing*." WECC trade ally reps also mentioned air compressors, more prescriptive lighting, inductive lighting, more VFDs, prescriptive building controls measures...As one WECC trade ally rep said, "*I can sit here for an hour…there's lots of little stuff*."

While there are some recurring suggestions for technologies that should be added to the prescriptive program, most interviewees agreed that the Non Res Smart $aver® currently offers a good mix of measures. As one WECC trade ally rep said, "*It is hard to imagine that a Duke Energy customer can't find some energy efficiency measure they can use*."

Incentives

Duke Energy reported that they determine incentive levels using feedback from trade allies, Duke's business relationship managers, and calculations from the technical consulting team.

The technical consultants calculate incentive levels using information gathered across a variety of sources. The technical consultant team looks at what kinds of incentives other utilities' programs are providing and try to determine if those programs have had traction with their incentive levels. They start out with an effort to have the rebate pay up to 50% of the incremental cost, and make adjustments using DSMore, a financial analysis tool for calculating impacts and cost effectiveness. The technical consultants also provide estimates of market activity and penetration at different incentive levels.

The measures that are recommended for inclusion in the prescriptive program are ones that have a standard application and ones for which there are established track records of energy savings. In cases where the energy savings show wide variability, conservative numbers are used in the model. Duke Energy's program managers make the final determination from a list that the consultants provide.

The technical consultant who was interviewed reported that they currently have very little direct interaction with WECC. He also reported that it would be useful to have WECC, as the implementer, review the projections of activity and energy savings to see whether they agree with the projections and levels of activity, and to answer the question, "*Can you deliver on it*?"

RECOMMENDATION: Share estimates of market activity with WECC and gather their feedback on whether they believe the projected market activity levels are realistic, based upon their experience in the field. This would allow WECC use their direct experience in the field to relay any coming customer purchasing trends that may not yet be reflected in historical data.

Feedback on incentives from the field

WECC shares a lot of feedback from trade allies about incentives that are not appropriate, and about technologies the trade allies think should be added or deleted. One rep for the Carolinas stated that "*HVAC incentives are not high enough to incentivize customers*". However, a rep for Ohio believed the current incentives are appropriate.

One WECC trade ally rep suggested that measures that do not meet the absolute energy efficiency threshold for inclusion in the prescriptive program might instead be assigned a partial incentive that is proportionate to its energy savings. For example, a smaller incentive could be given for high bay lighting measure that is 88.7% efficient instead of the required 90% efficient. "*You could make a tiered approach. Right now, prescriptive is all or nothing, and if it's nothing it goes into custom*." This may be a method of including more measures in the prescriptive program. The custom Non Res Smart $aver® is not within the scope of this evaluation but many trade ally reps have mentioned that there are large barriers relating to the difficulty and length of the custom application approval process as well as uncertainty about the incentives. These barriers prevent customers from participating in the custom Smart $aver® program. If the prescriptive program has more flexibility on the energy efficiency of the included measures, it may be able to capture those energy savings that are disappearing in the crack between the current prescriptive and custom programs.

RECOMMENDATION: Determine whether it is feasible to offer a tiered prescriptive program. . This would allow Duke Energy to capture energy savings from measures that do not quite meet current thresholds for prescriptive and would have to be processed through the custom program.

Barriers

Economic

Several reps mentioned the economic climate as being a major barrier to participation. One rep reported that while WECC was meeting their objectives, the poor economic conditions were having a noticeable effect. One rep mentioned that while some customers were able to afford $100,000 projects, they would decide only to implement a $70,000-80,000 project because of concerns about their economic future. Below, trade ally reps described in their own words the effects the poor economy is having on applications.

> *WECC is "working with vendors proposing [energy efficiency] projects based on good ROIs, and even good ROIs are being pushed off because [customers] are kind of afraid of what's going to happen with the economy and what they're going to do with their money."*

"Customers are looking for a less-than-2-yr payback period"

"Customers are saying, 'We're never going to get this project forward without upper management seeing a one year or 1.5 year payback.' So we'll roll in lighting in with the HVAC project."

Energy costs are very low in the Carolinas and a rep states, "Energy efficiency is not first and foremost in minds of folks".

"I'm honestly surprised that we have as much participation as we do in light of the economy…Most would not do it in this economy if not for the rebates."

"With lighting measures, you can phase it in with a maintenance program. You need to be in a budget for 5 yrs before a chiller gets approved."

Duke Energy program manager suggested as one solution that customers could be made more aware of lifecycle costs. "*What I see here are [people] focusing on: Here is the incentive, here is the capital cost, but not bringing into account the lifecycle costs of the measure*."

RECOMMENDATION: explore marketing and outreach campaigns that focus on lifecycle costs. Evaluate the effectiveness of this messaging focus, taking into account any further changes in the economic climate. This may allow customers to look beyond consideration about a measure's capital cost and its incentive, and understand the energy savings that would be delivered over the measure's effective useful life.

Paperwork

Another barrier is the amount of paperwork required in the application. Trade allies reported that they are spending a lot of time on the application and in many cases it is they who are filling out the applications on behalf of the customers. One trade ally rep said it was not unusual to spend 20 hours on an application. He recently helped a customer with a prescriptive application that was "*one inch thick*". Another trade ally rep agreed that customers are being deterred by the amount of paperwork for the incentives, and also points that this results in lost incentive money. The application can be submitted up to 60 days after the measures are installed, but because there is no motivation to fill out the paperwork immediately sometimes dollars are left on the table. "*It relies on customers' motivation to get money back*". The rep stated that the customers need to remember that they're paying into the rider.

WECC spends a lot of time itemizing measures on invoices submitted with the applications. Itemizations need to be provided on specifications sheets with exact model numbers so the correct incentive can be paid, but the model numbers are not always on the invoices. WECC does use a template for itemized invoices, and one trade ally rep suggests that this template should be widely distributed. Currently, the invoice

itemization template is only given to WECC, but it is not officially distributed and it is not on the Non Res Smart $aver® website.

RECOMMENDATION: Make the template for itemizing invoices available online. This guidance would allow trade allies and customers to send in more accurate applications that would be rejected less frequently and could be processed more quickly and cost effectively, without WECC needing to contact applicants for missing information.

Duke Energy has stated that they would like to provide more online tools, and this is supported by several trade ally reps. Currently, applications can be downloaded from the Non Res Smart $aver® website but they still need to be faxed in. If the online application is well-received, Duke should see three signs of success: 1) the application process has shifted to the customer and 2) the amount of time spent filling out the application is shorter, and 3) WECC spend less time shortening the amount of time processing the application.

RECOMMENDATION: Conduct usability studies and satisfaction surveys of online application process. This would allow Duke Energy to quantify any reduction in application speed and any increase in customer satisfaction with the application process.

Increasing Participation From End User Customers

One trade ally rep suggested that customers might achieve broader and deeper energy savings if they had more assistance ranking energy efficiency projects in terms of cost effectiveness. This rep mentioned Duke Energy's existing assessment program that provides a project assessment report tailored to a customer's facility, but explained that this program is only available for customers that use 500 kWh or greater. "*A lot of customers are not getting a whole lot of assistance in ranking energy efficient projects. It's customers who have a more comprehensive plan, almost a prescription, on how to go about their energy efficiency projects*" that achieve the deeper savings.

RECOMMENDATION: Implement and evaluate a pilot program to help <500 kWh customers to prioritize energy efficient projects. This may allow more Duke Energy customers to achieve greater savings by providing them with a more complete picture of their energy efficiency options.

Increasing Participation From Trade Allies

When asked how they might increase participation rates from trade allies, the WECC staff members almost unanimously mentioned the issue of paying incentives to the Non Res trade allies. As one rep said, "*I'm a big believer that compensation drives behavior*." As mentioned earlier, one reason for this fixation is the fact that incentives are given to the trade allies and vendors for the Residential program, and the same trade ally reps support both Res and Non Res vendors. One trade ally stated that the "*achievements of the Residential Smart $aver® may be as high as 150% above goal*, and attributed that achievement to "*the incentives that were given to the trade allies*". He suggested that perhaps trade allies might be "*given incentives for higher impact Non Res* projects".

One WECC trade ally rep reported that there are vendors who do realize the value of the Non Res Smart $aver® without needing additional incentive. These vendors complete applications as a value added service for their clients, and they have been successfully using the Non Res Smart $aver® program to market their own services

Most other reps supported the idea of paying the trade allies. "*Trades would love to get paid. A lot of them will do a free lighting audit in order to get the project*." One suggestion made was that Duke Energy might compensate trade allies for performance, perhaps by giving them part of the available incentive.

There may be good reasons for considering an incentive. One WECC program manager pointed out trade allies spend an "exorbitant" amount of time filling out proposals. If it were cost effective, this program manager believes Duke Energy may be willing to allow trade allies to receive some of the incentive funds, even if it means less for the customers.

Another option is to consider non-financial incentives. Recent focus groups with trade allies provided feedback that other utilities in the area offer the trade allies different kinds of non-financial incentives. As an example, one utility ranks trade allies with CFL icons after their names. One trade ally rep suggested "*it doesn't have to be a financial incentive, it could be a lead generation incentive*".

One trade ally rep for the Carolinas acknowledged that Duke Energy's regulatory constraints prevent them from changing the program to pay trade allies, and that a change to the program would mean a long process of refiling the program. This rep suggested a "stepwise" approach where non-financial incentives could be given, such as listing them higher on a directory, or on the Non Res Smart $aver® website, or acknowledging the particular trade allies that are driving projects. Objectives could also be tied to the non-financial incentives, so that Duke Energy give trade allies more leads or marketing resources if they reach 25 projects.

In response, Duke Energy reported that they have considered these options, but have not yet acted on these options because "*the program is running well as it is*" in terms of cost effectiveness. Duke Energy should decide upon an action sooner rather than later. The Residential program's high participation rates contrast sharply against the participation rates in the Non Res program. Whether warranted or not, WECC trade ally reps attribute this disparity to the fact that incentives are awarded in one program and not the other. As reported earlier, the different levels of program activity are negatively impacting the trade ally reps ability to devote enough time to outreach and verification activities.

RECOMMENDATION: Resolve the discrepancy in incentives provided to Res and Non Res trade allies with the goal of equalizing the workload division and trade ally benefits between the two programs. Trade ally reps must verify installations in both the Res and Non Res programs, and the high level of activity in the Res program takes time away from their verifications to the Non Res program and to the recruitment of Non Res trade allies. Any discrepancy in program activity that increases the disparity in program activity should be reviewed.

Increasing Participation from End Use Customers

When asked what might be done to increase participation from the end use customers, most of the WECC staff suggested more marketing to the customers. One rep said, "*I'd like to be able to prime the pump*" with more advertising such as public service announcements, billboards, radio and TV ads. Another rep agreed that Duke Energy should do more marketing: "*They're a large organization and should use everything at their disposal to get the word out"*.

One WECC program manager observed that most markets respond to a combination of supply push and demand pull. He believes there are more unrealized opportunities to increase demand pull for the Non Res Smart $aver® program. He suggested that the program might target property management firms. He also suggested that the program could provide more outreach to large industrial customers on a one-to-one basis with an energy advisor relationship, which he acknowledged Duke Energy is already doing to some extent.

The WECC program manager suggested that the marketing efforts be supported by data from market segmentation studies. This would allow the program to identify barriers that might be different for each sector, as well as to target messaging by sector. WECC suggested that the program should develop logic models at the segment level in order to specify what strategies should be employed against the different barriers. Another WECC program manager agreed and suggested that the program needed to provide consistent messaging and communication out to the marketplace. WECC knows there is some targeted marketing going on at Duke but no one really knows how the Smart $aver® brand ties into it.

RECOMMENDATION: Identify one high priority market and conduct a characterization study about that market. Identify that market's barriers to participation and develop a logic model that specifies a strategic approach toward overcoming those barriers. Evaluate the effectiveness of the approach at the end of the program cycle. This would allow Duke Energy to see if they would be able to successfully drive greater activity in a particular segment if there arose a need for doing so in the future.

Perceived Free Ridership

When asked about their perceptions of the level of free ridership, most trade ally reps said they believe it is very low because of poor economic conditions. These trade allies reported,

> *"In today's economy it's low…people are not spending money. The [desired] paybacks have changed dramatically from what companies were willing to invest before."*
>
> *"I think they're looking to the utility and trade allies to tell them how to cut their costs."*

"Not a problem until the economy recovers."

One trade ally rep believed that about 15% of the lighting retrofits would be done without the Smart $aver® program. However, the trade allies try to leverage any lighting-related free ridership by bundling the lighting measures with high impact measures such as chillers, which has a "huge" incentive but also requires a great capital expenditure. The bundling of high impact measures with lighting measures allows the overall project to be cost effective for the customer. Accordingly, another trade rep suggested that free ridership could be decreased by doing the converse and focusing on higher impact end uses when targeting the trade allies.

Two of the trade ally reps raised an interesting issue with regards to free ridership and the Non Res Smart $aver® program. One rep said, "*Many customers don't realize the impact of free ridership. They feel it's their money, they feel they're owed that incentive*." This concept of an incentive as an entitlement is something that another rep also spoke about. This other rep suggested that the concept of free ridership may not be applicable for the Non Res Smart $aver® program because the companies are already paying a hefty energy efficiency rider. "*They have to use the program. They're paying for it and pretty heavily for it*." In that sense, the companies are *paid* riders, not free riders. In many cases, the large Commercial and Industrial customers are very aware they have paid into this program and they already pay close attention to the program. Other customers report that they only started considering the program when a vendor tells them that they are already paying into the program and they ought to look into it.

RECOMMENDATION: Program managers should consider whether companies that actively seek out incentives are free riders or *paid* riders. Free riders are generally considered something to be avoided, and many utilities spend large amounts of evaluation money trying to determine the level of free ridership in their program in order to adjust their program's energy savings to only report net new savings achieved from the use of public funds. A *paid* rider, however, may be a different issue. Paid riders should be the target market for a program that they are paying for that seeks to return value to those who paid into it. In this case, a high level of paid ridership might be considered an indicator of program success.

Perceived Spillover

One WECC trade ally rep reported that there may be up to 15% spillover, just based upon anecdotal evidence. In some cases, the spillover is unintentional, and occurs when a customer intends to apply for an incentive but "*missed the mark*" with regards to the application deadline. To increase spillover, a WECC program manager suggested that if end users can be educated about the benefits of energy efficiency, it can become a competitive issue. Spillover would increase because dealers offering energy efficient equipment would have a competitive edge over other dealers, which would encourage those other dealers to also offer energy efficient equipment. A WECC trade ally rep

reported that there is definitely spillover to gas measures because vendors do not want to leave it out of an application. They know they're not getting incentives, but they can demonstrate savings for those gas upgrades for the customer.

Areas That Are Being Improved

Automation

A Duke Energy program manager believed that automating processes to capture program data would be the biggest improvement that the program needs. Currently, the program data is recorded across several different sources and must be integrated manually before it can be used to inform decision-making. Duke Energy is currently reviewing the information technology infrastructure of several of their energy efficiency programs with the goal of automation in mind. *"[We need to get] away from manual capture, [it's taking] people away from being able to think strategically when they are working on dumping data into a spreadsheet."*

Co-Branding

Duke is aware that the trade allies would like to co-brand with Duke Energy in order for them to get credibility with prospective customers. Duke Energy hopes to have a co-branding arrangement worked out by the end of the year.

New Service Contract

At the time of the evaluation, Duke Energy and WECC were discussing changes to the existing service contract, in order to align WECC's program objectives with Duke's. As part of this alignment, both sides agreed that in order to achieve higher impacts by focusing on large commercial and industrial customers and by pushing high impact technologies such as chillers and VFDs. At this time the new contract has not been negotiated, but as a good faith gesture, WECC has already adopted this new focus on larger customers and higher impact measures. Accordingly, WECC will now only respond reactively to trade allies' requests for information as opposed to the previous approach of actively seeking out opportunities to provide information. They will also only provide support to the Residential program trade allies and vendors only when they are asked to. This new direction was initiated in mid-summer of 2010, but both Duke Energy and WECC expect to see these efforts start paying off over the course of the next program year.

Trade Ally Interview Results

The two Smart $aver® trade allies from North Carolina and three trade allies from South Carolina were interviewed in March 2010. All of the interviews were conducted with a sales manager within the firm or an equivalent representative. Each of the respondents indicated that they are the individual within their company who has the most experience and is the most acquainted with the program. The interview protocol used during these interviews can be found in Appendix A: Vendor Interview Instrument.

The interviews were written to cover various aspects of the program, such as program operations, aspects of trade allies' involvement, incentive levels applied, covered technologies, and program effects from the trade allies' perspectives. The results of the process interviews are reported by the response categories presented below.

Program Materials

We asked the trade allies if they had enough program materials such as brochures, applications, and program documentation to effectively sell the program to their customers. All five trade allies indicated that they had enough program forms and applications for their short-term use, but thought that Duke Energy needed to provide more marketing materials to support and strengthen their individual marketing and outreach effectiveness to end customers. Both of the trade allies in North Carolina and one in South Carolina said that they had never received any marketing material support from Duke Energy for the Smart $aver® program.

Problems That Have Come Up

All trade allies interviewed said that their experiences with the program were free of any problems and that they were pleased with the program.

When we asked about customer complaints from the trade allies' perspective; in response to our question, trade allies reported that there have been very few customer complaints. The only customer complaints that have come up had to do with customers experiencing actual savings that was assessed to be slightly less than the estimated savings of the measure.

Two trade allies in South Carolina mentioned that since they use a table to calculate estimated savings, the actual savings for a measure can vary from customer to customer, but they both considered this a challenge that had more to do with understanding how Duke Energy charges for service than the Smart $aver® program technologies themselves. They also noted that already low overall energy bills made the savings from the measures sometimes appear to be less for certain customers whose energy bills are relatively low compared to the savings projections for customers with higher electric costs.

Wait Time for Incentive

The length of time that passes from when the application forms are submitted, to the arrival of the rebate check are described as reasonable by all five trade allies. The stated average length of time to wait for a rebate check varied very little from 2 to 3 weeks. While this evaluation did not confirm the wait times by reviewing the application dates and the date of the rebate distributions, past experience in these types of studies indicate that contractors and customers expect rebates to be promptly processed and paid. A 2 to 3 week period is not only reasonable, it is faster than other programs offered by other utilities we have evaluated in the past which have taken in excess of 4 to 6 weeks.

What About Smart $aver® Works Well

Each interviewed trade ally was asked what they think works well about the program. This question was then followed with a question about what changes should be made to the progam. The trade allies responded to the question of what works well about the program with a variety of responses. Three out of five trade allies mentioned ease of use and ease of forms as an aspect of Smart $aver® that works well. Further, two trade allies noted that the ease of forms allowed them to offer to fill out the forms for their customers and provide this service at no additional charge to their customers. Complex forms or rebate process whould require them to recover some of that cost via their pricing arrangments. Specific responses include:

- "It's easy to get done quickly. There's just enough paperwork to be thorough, but not too much to be a burden."
- "The rebate checks get to the customers very quickly."
- "WECC has been there for us whenever we've had a question, and they've been pleasant to deal with."

All trade allies interviewed see the program as a way to encourage customers to upgrade their lighting equipment to a higher efficiency level. In addition, these trade allies noted that the current rebates do provide an incentive for their customers to buy the more efficient product.

What Should Change About Smart $aver®

The responses to the question of what should be changed varied among the trade allies, with some vendors providing multiple responses. One of the common responses received is that trade allies would like to see a higher incentive payment to help their customers achieve a faster return on investment and increase the trade allies' sales rates for high efficiency products. Two trade allies mentioned the added value in pushing energy efficient products via a trade ally incentive as a way to achieve higher levels of energy savings. One trade ally thought a monetary incentive would work best, but another felt either a monetary or an incentive that increased awareness, such as a preferred vendor group, would be beneficial as well. Trade allies also want to submit online applications, although it was noted that the form process currently works well. Other comments received include:

- We'd like to see the energy efficiency levels be a little less stringent. It's tough to go from prescriptive to custom (or a whole new product) on the basis of less than a percentage point in difference.
- We focus directly on lighting. Sometimes I just think we get too much information about other measures.

Communications with Duke Energy Staff

All of the trade allies interviewed said that communication with Duke Energy staff was fine, though limited. No communication issues were identified by the interviewed allies.

Customer Awareness of Smart $aver®

Trade allies were asked how they made customers aware of the Smart $aver® program and then to describe the customers' initial reaction to the program.

All of the trade allies said they tell their customers about the program during normal sales communications and present it as a way to achieve a faster return on investment for the incented high efficiency technology. All trade allies said that customers respond positively to the idea of the incentive and the savings.

Both of the North Carolina trade allies and one of the trade allies in South Carolina said that the vast majority of their customers were not aware of the Smart $aver® program before it was presented to them (by the trade ally). Furthermore, all three trade allies said that their customers often do not initially believe that the rebates are real and need to be convinced of the rebate and estimated ROI (Return On Investment) either by visiting the Duke Energy Web site or talking to a Duke Energy representative. All three trade allies felt that his customers' skepticism over savings was a result of difficulty in understanding the Duke Energy billing system. These comments indicate that program brochures and informational materials may be helpful in convincing customers that the offer is legitimate and it can help convince customer to take advantage of the offer. TecMarket Works agrees that program brochures which support the market efforts can and typically do improve the penetration and sales rates and help trade allies move their high efficiency products.

Market Transformation

Trade allies were asked what the incentive level would have to be for more than 80 percent of the market to elect to up-grade to the energy efficient model. One trade ally responded that because of the current economic conditions most customers were looking for a maximum of an 18-month return on investment and a six-month ROI would achieve 80 percent of the market going to the more efficient unit. The most specific reply from a trade ally was that an incentive at 80 percent of the material cost of the equipment would achieve this goal. These comments suggest that the market has tightened as a result of the economic slow-down and that it may be getting harder to move customers to the up-graded choice. This also argues for building supportive materials for the allies to help

"up-sell" to the energy efficiency choice. It also suggests that the importance of the incentive and its impact on speed of the investment recovery is taking a higher place of importance in the decision framework. In these conditions we would expect to see a decrease in the number of freeriders as customer move toward the lower cost options as a result of increased economic pressures to minimize first costs. This condition also opens an opportunity for the allies to be more effective in helping the customers who can up-grade to the energy efficient choice, if the return can be clearly demonstrated to the customer and if the incentives are set at a point to be both cost effective and act as an effective change inducement.

Why Trade Allies Participate

Why trade allies participate varies from the basics (increased sales/profit) to the altruistic (doing the right thing for their customers).

- "In this economic climate it's often nothing or something instead of "how much". The program helps us get to "something."
- "You can't beat offering someone a discount."
- "When you can actually save a client money on the front end and the back end, that builds great trust."

Program Technologies and Incentives

We also talked to the trade allies about the technologies offered in the program, and the incentives that are provided. The technologies covered are supported by everyone we spoke with.

Technologies and Equipment Covered
All five trade allies interviewed thought that no technologies currently covered by the program should be removed.

Incentive Levels
All trade allies interviewed indicated that they were less than satisfied with the current incentive levels. One trade ally noted that in a down economy a higher rebate level is much more important than it is in a strong economy since the window for a return on investment is smaller. Another trade ally noted that it is often an all-or-nothing proposition for projects, so the incentive is inducing a tipping point rather than just increasing normal participation.

Other Technologies That Should Be Included
Trade allies mentioned six technologies that they thought should be considered for the program. The most often mentioned technologies were LED and induction lighting. Two trade allies also expressed a desire to see non-peak technologies such as parking lot lights covered. Other suggestions included:

- "Plain old de-lamping with reflectors."

- "There are some new compressor controllers that can give about 15 percent savings."

- "KVAR[4] units, compressor controllers. That should be the next focus."

How the Program Changes Business

Overall, the trade allies report that the program has changed their business by increasing their sales, increasing the size of their customer base, and providing high levels of customer satisfaction. The comments received from the interviewed contractors include:

- "It's helped us through a tough economic time. That's for sure. Without it we would have changed negatively."

- "It's good to be on the forefront of a changing marketplace. This allows us to get more knowledgeable on the technologies that are proven, and see that they work for ourselves."

- "We are able to better marry our customers' short and long-term savings goals."

Suggestions for Streamlining Participation Process

The only suggestion offered by the trade allies was to streamline the process came from contractors who suggested that the program applications be available via an online process and allow for online status checks of applications. All five trade allies said that this would improve their participation experience.

Program Results

We asked the trade allies about the benefits of their participation in the program to them and to their customers, and how the program has altered their business by changing what equipment they offer. None of the contractors have made significant changes to their marketing or stocking strategies because of the program. Their goal is to obtain the best return on investment for their customers. The incentives mean that they can push the energy efficient units at a reduced price allowing more customers to obtain a faster return on investment. These findings are consistent with the program theory to increase market penetration via rebates and incentives.

Smart $aver's® Influence to Carry Other Energy Efficient Options

Three of the five trade allies said that the program has resulted in their businesses carrying other energy efficient equipment not covered by the program. Two trade allies now carry solar devices, two carry LEDs, and one carries power factor correction devices. We note that the addition of additional product lines is a metric associated with market transformation impacts above and beyond direct program impacts. That is, the

[4] http://www.kvar.com/1000/home

program's effect has been to increase the market availability of other energy efficient products carried by these allies.

Program's Effect On Manufacturing Practices

Two of the five trade allies thought that the program has increased the numbers of energy efficient technologies being manufactured (an indication of possible market effects above and beyond the program). Furthermore, one trade ally said that less efficient products are being pushed out of the available technology market because of the specifications required for the rebates. Three trade allies were unsure of the program's effect on manufacturing. These responses provide an indication of possible market effect savings that can occur as programs influence the operations of a technology market.

Program's Influence on Business Practices

We asked the contractors if their business would change if the Smart $aver® program were no longer offered. We posed the question: *"If the program were to be discontinued, what would happen to the volume of sales of the high efficiency models?"* All five trade allies indicated that sales would decline "on the edge" [lower sales volumes] to "dramatically" decline [significantly lower sales volumes]. This response indicates that these allies think that a substantial part of their company's total sales are program induced, suggesting low freerider levels. Specific responses include:

- "Right now it's all or nothing, so we'd have a lot more nothing."
- "It would cut sales for sure."
- "We'd certainly focus on different products, and not try to sell program measures as hard."
- "I think we'd have a pretty heavy revenue gap [for our business] if that happened."

None of the trade allies said they would change their high efficiency model pricing structure if the program were no longer available, suggesting that the program has not had an impact on product pricing. This also indicates that the customers are getting the full advantage of the rebates because the allies are not up-pricing.

We also asked the contractors what percent of their total measure sales were high efficiency and what percent were rebated through the Duke Energy program. Only two trade allies were able to provide percentages. Both trade allies reported 100 percent high efficiency units are being pushed and sold, and 100 percent of their customers are receiving the Duke Energy rebates.

Continuing Need For The Program

We asked the trade allies if they thought that the program was still needed. All of the interviewed trade allies said yes the program should continue. All trade allies considered

the Smart $aver® program an essential sales tool for energy efficient equipment and indicated that sales of energy efficiency models would fall to dramatically fall.

Freeriders

We also asked the trade allies to estimate the level of freeriders. Only two trade allies felt qualified to answer questions about their customers' level of freeridership. The other trade allies felt that since many projects were based on return on investment and life-cycle, it would be hard to quantify freeridership. That is, those trade allies use the incentives to fit the customers' ROI requirements and the overall ROI is what decides whether the project goes forward. Since the trade allies don't offer an either/or scenario and also handle much of the paperwork, many customers may not be aware of the role that the incentive plays in their decision. One trade ally also mentioned that once the rider is explained to them, some customers' feel they are recouping the incentive.

One trade ally did report that the rebate makes a great difference to 50 percent of their customers and at least somewhat of a difference to 25 percent. Another trade ally stated that the rebate makes a great difference to 30 percent, somewhat of a difference to 60 percent and little or no difference to 10 percent of customers. These estimates, while not reliable indicate that the trade allies think freeridership would be in the 15% to 40% range.

Participant Survey Results

We interviewed 20 (10 in North Carolina and 10 in South Carolina) out of a possible 73 Smart $aver® participants for which we were provided contact data and measure description. Five participants were surveyed on two different energy efficient measures.

Overall Satisfaction

Participants were asked about their overall satisfaction on a one-to-ten scale with one indicating they were completely unsatisfied and ten indicating that they were completely satisfied with the Smart $aver® program. We also asked about their satisfaction with Program Understandability, Duke Energy Staff, Rebate Levels, Rebate Time, Technologies Covered, and Information Materials. As shown in Figure 1 participants have a high satisfaction rate with the Smart $aver® Program. Only three categories received any ratings from customers less than 7: Technologies Covered, Rebate Levels, and Communication with Duke Energy Staff. Those participants noted that the rebate levels could be higher. Two customers indicated that Duke Energy was often unclear when requesting more information for applications. However, these customers also indicated that they were referring to custom applications rather than the prescriptive applications covered in this report.

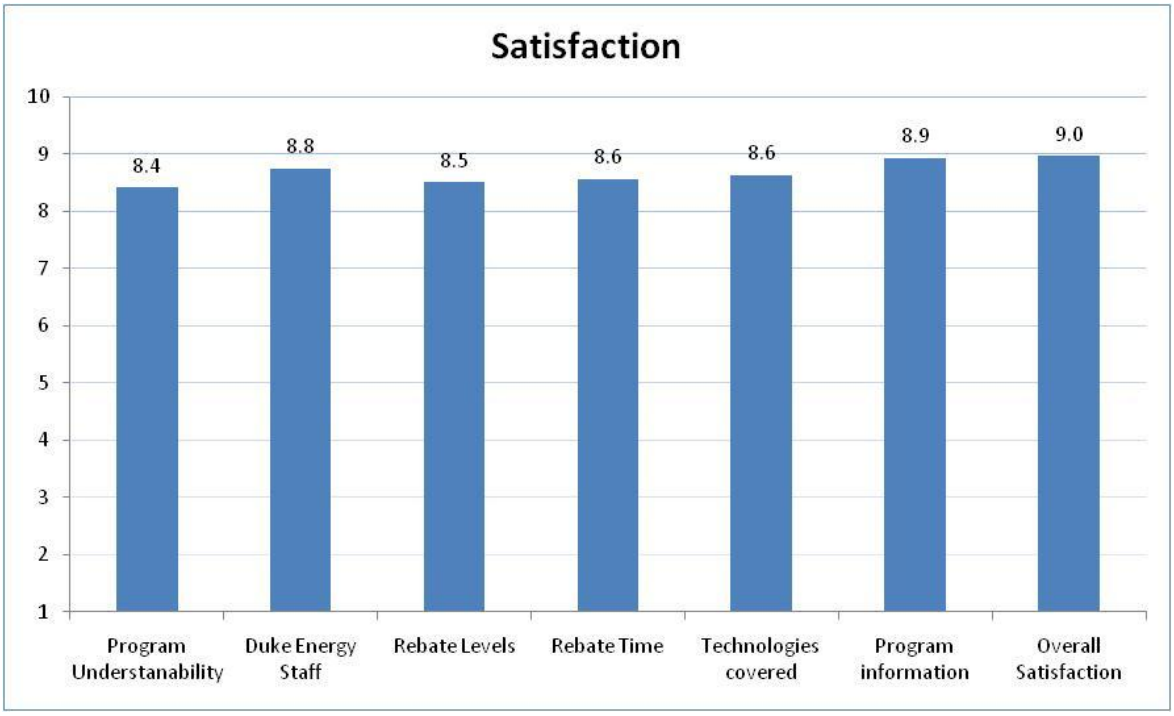

Figure 1. Overall Satisfaction with Non-Residential Smart $aver® Prescriptive

Motivating Factors

Participants were asked an unprompted question for to identify all the factors that motivated them to purchase the energy saving device. Figure 2 shows the factors mentioned as well as the percentage of participants surveyed who mentioned each factor. Ninety-one percent (91%) of participants cited a desire to reduce energy costs as a motivating factor with the program incentive being the next highest cited factor at 50%. Together, these indicate that the desire to save energy/money, linked to the incentive to lower the procurement price barrier is an effective combination. Three of the reasons given under the "other" category were "a corporate directive regarding energy efficiency" and one reason expressed as "because of a federal grant" we received.

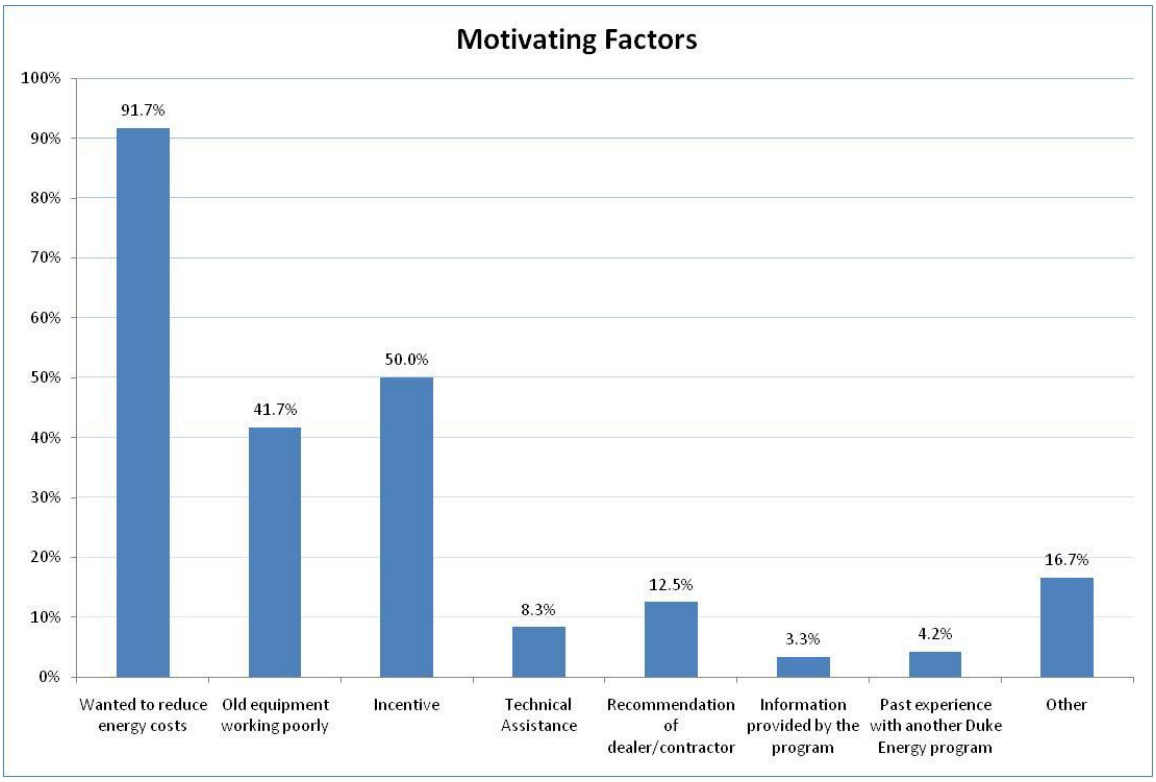

Figure 2. Factors that motivated participants to purchase an energy saving device

Technology Being Replaced

Five (25%) of the surveyed participants indicated that the measures installed replaced a similar energy efficient measure. Four of these participants indicated that the measure being replaced was 5 to 9 years old, and one indicated the measure being replaced was less than five years old.

Two participants (10%) indicated that this was their first purchase of the particular energy efficient measure that they installed and had rebated through the Smart $aver® program.

Incentive Forms

Fourteen of the 20 participants (70%) surveyed said that they personally filled out the incentive forms. Of those 14, 13 (93%) said that they had no problems in understanding or completing the forms. One participant indicated that the forms had to be re-submitted and the follow-up with a Duke Energy Representative was satisfactory.

Wait Time for Incentive

The length of time that passes from when the application forms are submitted, to the arrival of the rebate check are described as reasonable and free of problems by all 20 participants.

What About Smart $aver® Works Well

Each participant was asked what they think works well about the program. Three participants (15%) cited the incentive as what they liked the most. Two participants (10 %) also cited the simplicity and understandibiltiy of the program.

Increasing Participation

Participants were asked what they thought would increase participation in Smart $aver®. Five participants thought that awareness for the program was very low and that Duke Energy should advertise the program more aggressively. Two customers mentioned never having heard of the program until the trade ally brought it to their direct attention. One participant recommended making technologies that are currently only available in custom options, such as LEDs, available for the prescriptive program.

What Should Change About Smart $aver®

Five participants (25%) offered examples of what they thought could be changed in the program:

- "Ask us what our needs are instead of telling us what's covered."
- "Filling out the paperwork, but I didn't find it unreasonable."
- "Not enough customers know about it."
- "Higher rebate levels."
- "I'd like to check the status of my rebate."

Non-Residential Smart $aver® Net to Gross Analysis

In order to estimate the net savings attributed to the program several questions were added to the participant questionnaire. These questions were asked to determine the extent to which the program's information and incentives caused the program-covered and spillover actions to be taken by the participants. To conduct the freeridership analysis we used the responses from three questions to estimate the net-of-freeriders level

of savings for the program-rebated installation. We also used the results from two questions to estimate the amount of spillover savings. The questions were presented to the participants using a statement format in which the respondent could agree or disagree at various levels. Respondents were asked to provide their response using a 1 to 10 scale where a 1 meant that they strongly disagreed with the statement and a 10 indicated that they strongly agreed.

Freeridership Analysis
The three questions used to estimate the net to gross ratio included the following:

Net to Gross Questions

1. The rebate from the Duke Energy Smart $aver® Program was a critical factor in my decision to purchase the high efficiency/energy efficient product.

2. I would have bought the same make and model of the < *incented item*> within one year of when I did, even without the rebate from the Duke Energy Smart $aver® Program.

3. The rebate from the Duke Energy Smart $aver® Program was not necessary to cause me to purchase the higher efficiency product when your company bought the new <*incented item*>.

				Responses					
Strongly Disagree									Strongly Agree
1	2	3	4	5	6	7	8	9	10

We reverse the direction of the score for two of the above questions to help eliminate bias in the response scores.

Because the scale was built to reflect a 1 to 10 score, the scores from the responses were used as direct calculation metrics for estimating the NTG inputs to a distribution approach to set the freeridership score. That is, if they responded with a score of an 8, then 8 points were added to a NTG point tally for that individual. If they responded with a 2, then 2 points were added to their tally. However, because for two questions a low response score meant a high freerider score, and in the other a low score response meant a low freerider score, the scores had to be adjusted to be comparable as a group. This meant that for two of the scores, the score provided had to be subtracted from 10 to be comparable with the other question responses. This allowed all scores to be added in a way that a 100% non-freerider score would add to 30 (10+10+10) and a 100% freerider score would add to 3 (1+1+1). We then applied a linier distribution to the range of scores with the end values tied to either a 100% freerider or a 100% non-freerider, both of which we had in the respondent population. This approach eliminated any evaluator bias associated with the assignment of a NTG score for any participant because that value was numerically assigned as a linier function of their distribution between a 100% freerider and a 100% non-freerider. That is, the scores were normalized to their relationship between these two extremes. A respondent that was numerically half way between the

two extremes (regardless of their point score) was mathematically assigned a NTG score of .5.

The results of this analysis provided a program average NTG ratio of .63, meaning that 63% of the achieved savings are non-freerider savings and fully countable as a program's net effect. This placed the freerider score at .37, meaning approximately 1 out of every 3 participants received the rebate for an action that they would have taken without the program.

Spillover Analysis – Short Term

Two questions were added to the survey to estimate the level of short and longer term spillover. Short term spillover is defined as actions taken by participants above and beyond those rebated by the program, but for which the program was a driving influence for the participant taking that action. The questions asked include:

1. Since you participated in the Smart $aver® Program, have you purchased and installed any other type of high efficiency equipment or made energy efficiency improvements at your company or at any other locations? *<Y/N>*

2. My experience with the Smart $aver® Program in <2008, 2009> influenced my decision to install different types of high efficiency equipment on my own. (agree or disagree – see point scale)

				Responses					
Strongly Disagree									Strongly Agree
1	2	3	4	5	6	7	8	9	10

If the respondent indicated that they have not purchased or installed any other type of high efficiency equipment since their participation in the program, the spillover level was set to zero and no spillover credit was provided. If they responded that they had purchased energy efficient equipment, they were asked about the type of equipment and where it was installed. However, no spillover points were provided to these respondents that took additional actions unless they also indicated that their experience with the program caused, to some degree, that action to be taken by scoring some level of agreement with the agree or disagree question. If they indicated that the program was influential in their purchase and use decision, then their freerider score was adjusted by the fractional amount of the strength of the influence value they provided in their response to the agree / disagree question. That is, if the respondent indicated that they had purchased additional energy efficient items and also indicated that the program was influential in that purchase at a score of 7 (level of agreement or disagreement) then their NTG score (for that individual) was multiplied by .7 to estimate the short term spillover effects for that installation.

This approach provided an addition spillover score that was equal to their NTG score, but reduced by the fraction of the level of agreement that the program caused that spillover action to be taken. Thus, if they were a 50% freerider (see freerider analysis above) and

they scored a 7 on their agree / disagree score that the program was to some degree influential in causing their spillover purchase, then the spillover score for that individual participant was .35 (.5*7=.35). In this case .35 is provided as a short term spillover score for that participant for that action taken. The short term spillover scores were then summed and averaged over all participants, including those that took no additional action (and received a 0.0 spillover score), to arrive at an estimated short term spillover score. The result of this analysis is that the short term spillover score equals .11 over the entire population, indicated that the program increased savings by driving at least some customers to take additional actions that were influenced by their participation in the program. While this added savings is small and suggests that perhaps an additional 11% savings is being achieved by the participants in the program, we caution on this interpretation. The assignments of spillover is subjective and depends on the ability of the agree/disagree score to actually estimate the degree of causation. While we are sure that the program was influential in helping to acquire the added savings, this analysis is not definitive. For this reason, we project that short term spillover credit be set at 10% as an estimate for short term spillover.

Spillover Analysis – Longer Term

Our analysis also indicates that there is an additional impact on longer term spillover levels, but that level may be small. The short term spillover analysis only provided spillover credit to those that indicated the program was at least to some degree influential in their decision to take additional action, and who also had already taken additional actions. For the longer term spillover analysis we used the score of the program's influence on their decision to purchase additional energy efficiency items, even if they have not yet made a purchase. That is, we used their score for the agree/disagree spillover question above on the program's influence to install energy efficient items, even if they have not yet made an additional purchase. The scores received ranged from a 9 - indicating that for some the program has had a strong effect on their future purchase decisions - and a 1 meaning that the program had no effect. The average score across all surveyed participants is 2.4, indicating that there is some influence, but for the most part, that influence is small. Because of the low score we do not provide an estimate of longer term spillover, but note that there appears to be some level of influence. However, at this time and using this approach, the results are not strong enough to provide an estimate.

Net to Gross Score

For this program, using the approach discussed above, we estimate that the final net to gross score is approximately 0.73 including a freeridership NTG of 0.63 and a short-term spillover NTG of 0.10. However, because of the small sample size used to drive this analysis (N=26), we expect the NTG ratio for this program should fall at a point greater than 0.60 but less than a 0.75. As a result, we suggest using the NTG ratio of 0.70 for the program as a whole until more definitive research can be conducted.

Impact Analysis

The impact evaluation employed a tracking system review, an engineering review of the lighting measure savings calculations, and field measurement and verification (M&V) of selected lighting measures. The tracking system review revealed that a few measures were responsible for the majority of the savings. Tracking data for North Carolina obtained from Duke Energy from Nov, 2008 through April, 2010 show the following breakdown of energy savings by measure:

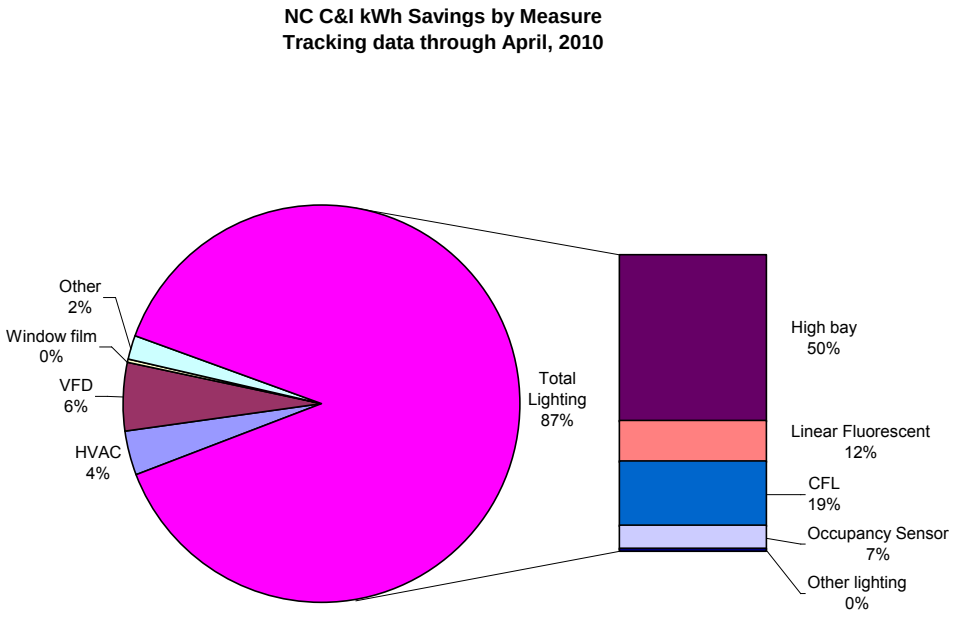

Figure 3. Measure Contribution to NC C&I Program Savings.

Note, lighting measures made up 87% of the total reported savings. Lighting was dominated by high-bay applications, making up 59% of the total lighting savings, and 50% of the total program savings.

Tracking data for South Carolina obtained from Duke Energy from Nov, 2008 through April, 2010 show the following breakdown of energy savings by measure:

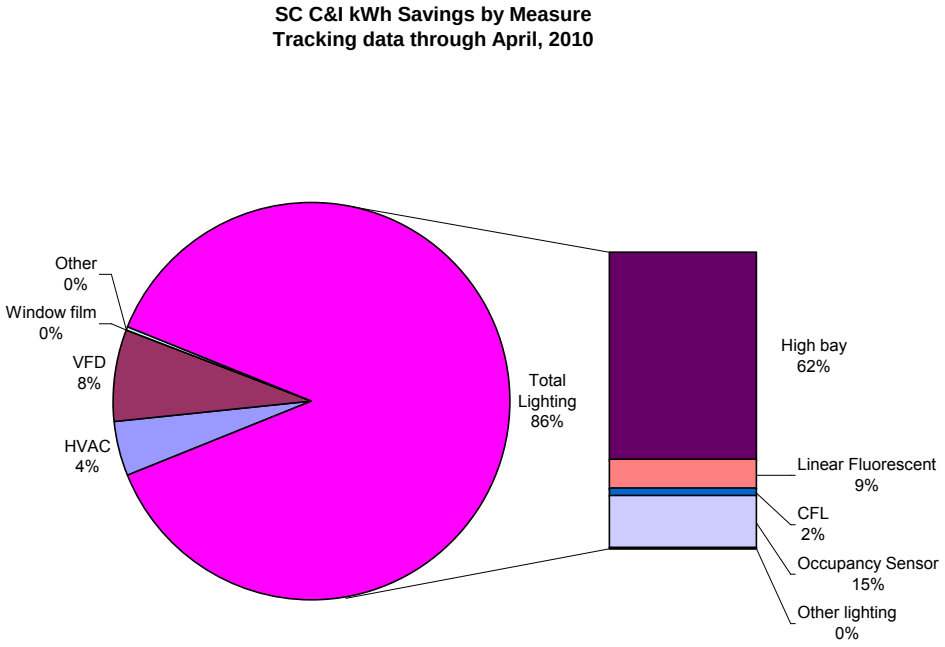

Figure 4. Measure Contribution to SC C&I Program Savings.

Note, lighting measures made up 86% of the total reported savings. Lighting was dominated by high-bay applications, making up 70% of the total lighting savings, and 62% of the total program savings. Based on this analysis, the impact evaluation was conducted as follows:

Lighting measures. We focused on the high bay applications, since these made up 59% to 70% of the total lighting savings[5]. Engineering review of the lighting savings involved a comparison of the measure savings recorded in the program tracking database to the savings estimates used in program design. This comparison revealed a problem with the tracking system savings estimates. The savings for each measure were recalculated using the fixture kWh and kW savings estimates developed during program planning and entered into DSMore; and measure counts as recorded in the tracking system

The evaluation team conducted field M&V on a sample of high bay lighting participants to estimate savings for this measure. The field M&V consisted of a site visit, verification of the quantity and type of incented lighting fixtures, verification of fixture wattage assumptions against manufacturer's catalog data, interviews with customers to identify the type and quantity of the replaced fixtures, and short-term monitoring of lighting system operation using light loggers to verify operating hours. The field M&V activities

[5] Note, an initial tracking system analysis based on tracking system energy savings showed high bay fixtures comprised a much larger fraction of the total lighting savings. During a more detailed review, the tracking system energy savings were found to be in error. Program planning estimates were substituted for the tracking system estimates, resulting in the measure breakdown shown in Figure 4.

were conducted by Duke Energy contractors and the results were forwarded to Architectural Energy Corporation for analysis. The field M&V activities were compliant with the International Performance Measurement and Verification Protocols (IPMVP) Option A – Partially measured, retrofit isolation protocol.

A sample frame of high bay lighting participants was developed by TecMarket Works and a random sample of 35 sites was selected across both states. Each site was recruited for the M&V study by the Duke Energy M&V contractors. The contractors were successful in recruiting and installing instrumentation at all 35 sites.

Lighting Analysis

Lighting program participation records covering the period from November, 2008 through the end of April, 2010 were obtained from Duke Energy. The data, delivered as an Access database, contained customer name and address, installing vendor contact information, measure descriptions, unit energy savings estimates, number of measures installed, lighting operating hours, installed fixture watts, rebate amounts, and so on. These data were examined to identify which of the measures promoted by the program were adopted by program participants and in what numbers, how the energy savings in the tracking system compared to the program savings estimates, and the availability of any customer description data that could be used in the analysis.

The lighting program tracking system showed lighting measures installed in sites representing a total of 360 participating customers. The types and quantity of measures installed are shown in Table 1 and Table 3.

Table 1. Lighting Measures Installed Under NC Program

Measure Group	Count	kWh	kW
CFL	42,341	8,363,758	2,219
Exit sign	734	168,086	23
High Bay	23,600	19,320,423	4,644
Linear Fluorescent	84,798	5,225,489	1,392
Occupancy Sensor	4,934	2,980,754	615

Table 2. Lighting Measures Installed Under SC Program

Measure Group	Count	kWh	kW
CFL	1,591	336,146	89
Exit sign	65	14,885	2
High Bay	12,615	10,299,462	2,717
Linear Fluorescent	17,195	1,423,242	378
Occupancy Sensor	4,803	2,555,682	530

The distribution of measure installations and savings by the measure groups defined above are shown in Figure 5 and in Figure 6.

Figure 5. Distribution of Lighting Measure Installation Counts by Measure Group

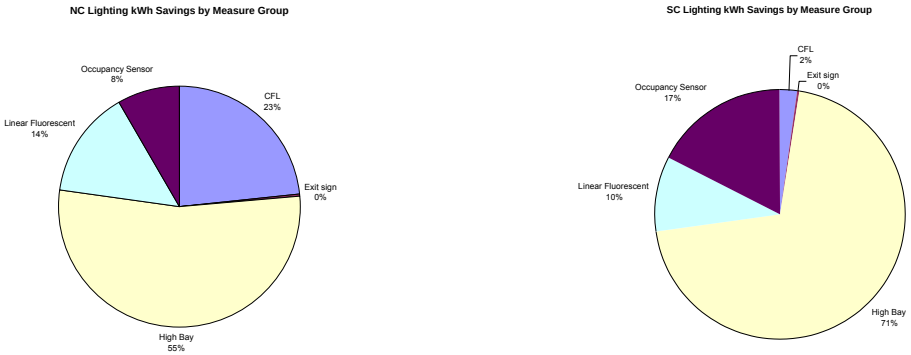

Figure 6. Distribution of Lighting Measure kWh Savings by Measure Group

Note, while high bay fixtures only accounted for 15% to 35% of the measure count, they accounted for 59% to 70% of the total lighting kWh savings, due to higher energy savings per measure.

Revised Tracking System Gross Energy and Demand Savings.

As mentioned above, the algorithms used by the program tracking database to record energy and demand savings were found to be in error. A set of revised energy and demand savings estimates was developed for each measure in the program tracking database using the unit savings estimates used during program planning. The unit kW and kWh savings[6] assigned to each lighting measure are shown in Table 3.

Table 3. Lighting Fixture Savings Assumptions

[6] Based on lighting fixture wattage data developed by Franklin Energy Services (FES) for Duke Energy. HVAC interactive effects multipliers from the Ohio Technical Reference Manual (TRM) applied. Demand interactive effects multiplier (WHF_d) = 0.20; kWh interactive effects multiplier (WHF_e) = 0.097.

Fixture type	Standard Fixture Watts	Efficient fixture watts	kW savings per fixture	Assumed operating hours	kWh savings per fixture
CFL					
Compact Fluorescent Fixture	105	30.5	0.089	4144	339
Compact Fluorescent Screw in	60.5	17.3	0.052	4144	196
High Bay Lighting					
High Bay 2L T-5 High Output	194	122	0.086	4144	327
High Bay 3L T-5 High Output	290	182	0.130	4144	491
High Bay 4L T-5 High Output	458	234	0.269	4144	1018
High Bay 6L T-5 High Output	458	351	0.128	4144	486
High Bay 8L T-5 High Output	850	486	0.437	4144	1,655
High Bay Fluorescent 3 Lamp (F32 Watt T8)	194	112	0.098	4144	373
High Bay Fluorescent 4 Lamp (F32 Watt T8)	295	151	0.173	4144	655
High Bay Fluorescent 6 Lamp (F32 Watt T8)	458	226	0.278	4144	1,055
High Bay Fluorescent 8 Lamp (F32 Watt T8)	455	299	0.187	4144	709
2 High Bay 6L T-5 High Output replacing 1000W HID	1080	730	0.420	4144	1,591
2 High Bay Fluorescent 8LF32T8 - Replacing 1000W HID	1080	598	0.578	4144	2,191
42W 8 Lamp High Bay Compact Fluorescent	455	372	0.100	4144	377
Pulse Start Metal Halide	455	372	0.136	4144	514
High Performance T8					
High Performance T8 4ft 1 lamp, replacing standard T8	31	26	0.006	4144	24
High Performance T8 4ft 1 lamp, replacing T12-HPT8	43	26	0.021	4144	78
High Performance T-8 4ft 2 lamp replacing T-12 8ft 1 lamp	75	57	0.022	4144	83
High Performance T-8 4ft 2 lamp replacing T-12 High Output 8ft 1 lamp	113	66	0.057	4144	215
High Performance T8 4ft 2 lamp, replacing standard T8	58	50	0.010	4144	38
High Performance T8 4ft 2 lamp, replacing T12-HPT8	72	50	0.027	4144	101
High Performance T8 4ft 3 lamp, replacing standard T8	85	76	0.011	4144	43
High Performance T8 4ft 3 lamp, replacing T12-HPT8	115	76	0.047	4144	179
High Performance T-8 4ft 4 lamp replacing T-12 8ft 2 lamp	123	110	0.016	4144	61
High Performance T-8 4ft 4 lamp replacing T-12 High Output 8ft 2 lamp	207	127	0.095	4144	361
High Performance T8 4ft 4 lamp, replacing standard T8	112	98	0.017	4144	64
High Performance T8 4ft 4 lamp,	144	98	0.055	4144	210

Fixture type	Standard Fixture Watts	Efficient fixture watts	kW savings per fixture	Assumed operating hours	kWh savings per fixture
replacing T12-HPT8					
Standard T-8					
T-8 2ft 1 lamp	28.0	18	0.012	4144	45
T-8 2ft 2 lamp	56	32	0.029	4144	109
T-8 2ft 3 lamp	62	50	0.014	4144	55
T-8 2ft 4 lamp	112	65	0.056	4144	214
T-8 3ft 1 lamp	46	25	0.025	4144	95
T-8 3ft 2 lamp	81	46	0.042	4144	159
T-8 3ft 3 lamp	127	70	0.068	4144	259
T-8 3ft 4 lamp	162	88	0.089	4144	336
T-8 4ft 1 lamp	43	31	0.014	4144	55
T-8 4ft 2 lamp	72	59	0.016	4144	59
T-8 4ft 3 lamp	115	89	0.031	4144	118
T-8 4ft 4 lamp	144	112	0.038	4144	145
T-8 8ft 1 lamp	75	58	0.020	4144	77
T-8 8ft 2 lamp	123	109	0.017	4144	64
T-8 High Output 8 ft 1 Lamp	113	80	0.040	4144	150
T-8 High Output 8 ft 2 Lamp	207	160	0.056	4144	214
Low Watt T8					
High Performance Low Watt T8 4ft 1 lamp, replacing standard T8	32	25	0.008	4144	32
High Performance Low Watt T8 4ft 2 lamp, replacing standard T8	59	49	0.012	4144	45
High Performance Low Watt T8 4ft 3 lamp, replacing standard T8	89	72	0.020	4144	77
High Performance Low Watt T8 4ft 4 lamp, replacing standard T8	112	94	0.022	4144	82
Low Watt T8 lamps replacing standard 32 Watt T-8's	32	28	0.005	4144	18
T-5 and HO T-5					
T-5 1 Lamp with Electronic Ballast (replacing T-12 fixture)	44	32	0.014	4144	55
T-5 2 Lamp with Electronic Ballast (replacing T-12 fixture)	77	65	0.014	4144	55
T-5 3 Lamp with Electronic Ballast (replacing T-12 fixture)	120	93	0.032	4144	123
T-5 4 Lamp with Electronic Ballast (replacing T-12 fixture)	150	126	0.029	4144	109
T-5 High Output 1 Lamp with Electronic Ballast (replacing T-12 fixture)	77	62	0.018	4144	68
T-5 High Output 2 Lamp with Electronic Ballast (replacing T-12 fixture)	141	122	0.023	4144	86
T-5 High Output 3 Lamp with Electronic Ballast (replacing T-12 fixture)	210	185	0.030	4144	114
T-5 High Output 4 Lamp with Electronic Ballast (replacing T-12 fixture)	295	243	0.062	4144	236

Fixture type	Standard Fixture Watts	Efficient fixture watts	kW savings per fixture	Assumed operating hours	kWh savings per fixture
Exit Signs					
LED Exit Signs Electronic Fixtures (Retrofit Only)	31.2	4	0.031	8760	229

Unit demand and energy savings assumptions for LED fixtures and lighting controls[7] are shown in Table 4.

Table 4. Unit Demand and Energy Savings for LED and Lighting Control Measures

Fixture	KW/unit	KWh/unit
LED Auto Traffic Signals	0.085	275
LED Pedestrian Signals	0.044	150
Occupancy Sensors over 500 Watts	0.249	1228
Occupancy Sensors under 500 Watts	0.102	490

Customers indicated the annual operating hours of their lighting systems on the incentive applications. These self-reported lighting system hours of operation are entered into the program tracking database. A tabulation of the average self reported operating hours by building type are shown in Table 5.

[7] Based on lighting fixture energy and demand savings data developed by Franklin Energy Services (FES) for Duke Energy. HVAC interactive effects multipliers from Ohio TRM applied.

Table 5. Self-Reported Lighting Operating Hours by Building Type

Building Description	Operating hour report frequency by building type	Average self-reported operating hours from program application
Education K-12	208	2,745
Education other	39	3,772
Elder Care/Nursing home	54	8,651
Fast Food	15	2,000
Full Service Restaurant	17	3,184
Healthcare	20	5,376
Industrial	193	5,466
Lodging	46	2,860
Office	95	3,010
other-institutional	11	5,211
other-mass	191	4,707
Public Assembly/Church	18	2,710
Public Order Safety	7	3,263
Religious Worship	3	2,109
Retail (Mall)	5	3,542
Retail (non-mall)	212	4,751
Service	24	3,255
Warehouse	53	4,183

The distribution of the self-reported operating hours by building type and fixture type is shown in Table 6:

Table 6. Self-Reported Lighting Operating Hours by Building and Fixture Type

Building Type	CFL	Linear fluorescent	High Bay
Education K-12	5,908	2,136	2,375
Education other	2,876	3,874	
Elder Care/Nursing home	8,467	8,760	
Fast Food	2,000		
Full Service Restaurant	3,154	3,280	
Healthcare	1,800	5,308	6,927
Industrial	8,736	4,676	5,945
Lodging	2,884	1,800	
Office	3,018	3,039	2,493
other-institutional		4,876	6,718
other-mass	7,304	3,946	5,979
Public Assembly/Church	2,467	3,107	2,526
Public Order Safety		3,248	3,300
Religious Worship	1,820	2,254	
Retail (Mall)	3,978	1,800	
Retail (non-mall)	4,919	4,689	4,843
Service	3,500	3,244	

Building Type	CFL	Linear fluorescent	High Bay
Warehouse		4,428	4,094

High Bay Lighting M&V Study

A sample of 35 customers installing High Bay Lighting fixtures was selected across NC and SC. A summary of the characteristics of the customers that participated for the High Bay Lighting Study is shown in Table 7 and Table 8.

Table 7. NC High Bay Lighting M&V Study Participants

Site	Business Type	Total fixtures rebated	Installed Fixture(s)	Baseline Fixture(s)
1	Education K-12	48	T8 High-bay- 4 ft 6 lamp	MH 400
2	Public Assembly/Church	20	T8 High-bay- 4 ft 6 lamp	MH 400
3	Public Assembly/Church	20	T8 High-bay- 4 ft 6 lamp	MH 400
4	Public Assembly/Church	25	T8 High-bay- 4 ft 6 lamp	MH 400
5	Public Assembly/Church	12	T8 High-bay- 4 ft 6 lamp	MH 400
6	Retail (non-mall)	503	T8 High-bay- 4 ft 6 lamp	MH 400
7	Retail (non-mall)	580	T8 High-bay- 4 ft 6 lamp	MH 400
8	Retail (non-mall)	477	T8 High-bay- 4 ft 6 lamp	MH 400
9	Retail (non-mall)	580	T8 High-bay- 4 ft 6 lamp	MH 400
10	Retail (non-mall)	589	T8 High-bay- 4 ft 6 lamp	MH 400
11	Retail (non-mall)	576	T8 High-bay- 4 ft 6 lamp	MH 400
12	Industrial	115	T5 HO High Bay 6L	MH 1000
13	Retail (non-mall)	48	T8 High-bay- 4 ft 6 lamp T8 High-bay- 4 ft 8 lamp	MH 400
14	Retail (non-mall)	66	T8 High-bay- 4 ft 6 lamp T8 High-bay- 4 ft 8 lamp	MH 400
15	Retail (non-mall)	49	T8 High-bay- 4 ft 6 lamp T8 High-bay- 4 ft 8 lamp	MH 400
16	Education K-12	15	T8 High-bay- 4 ft 4 lamp	Incandescent 500
17	Industrial	80	T5 HO High Bay 6L	MH 1000
18	Retail (non-mall)	49	T8 High-bay- 4 ft 6 lamp	MH 400
19	Education K-12	42	T5 HO High Bay 6L	MH 400
20	Education K-12	60	T8 High-bay- 4 ft 4 lamp	MH 400

Table 8. SC High Bay Lighting M&V Study Participants

Site	Business Type	Total fixtures rebated	Installed Fixture(s)	Baseline Fixture(s)
1	Warehouse	16	T5 HO High Bay 6L	MH 400
2	Warehouse	54	T8 High-bay- 4 ft 6 lamp	MH 400
3	Industrial	259	T8 High-bay- 4 ft 4 lamp	T12 HO 8 ft 2

Site	Business Type	Total fixtures rebated	Installed Fixture(s)	Baseline Fixture(s)
				lamp
4	other-mass	20	T5 HO High Bay 6L	MH 400
5	Retail (non-mall)	65	T8 High-bay- 4 ft 6 lamp	MH 400
6	Industrial	296	T5 HO High Bay 6L	MV 400
7	Office	66	T8 High-bay- 4 ft 6 lamp	MH 400
8	Industrial	40	T5 HO High Bay 4L	MH 400
9	Warehouse	54	T5 HO High Bay 4L	MH 400
10	Industrial	60	T5 HO High Bay 4L	MH 400
11	Retail (non-mall)	59	T8 High-bay- 4 ft 6 lamp T8 High-bay- 4 ft 8 lamp	MH 400
12	Retail (non-mall)	55	T8 High-bay- 4 ft 6 lamp T8 High-bay- 4 ft 8 lamp	MH 400
13	Retail (non-mall)	65	T8 High-bay- 4 ft 6 lamp T8 High-bay- 4 ft 8 lamp	MH 400
14	Retail (non-mall)	48	T8 High-bay- 4 ft 6 lamp T8 High-bay- 4 ft 8 lamp	MH 400
15	Retail (non-mall)	574	T8 High-bay- 4 ft 6 lamp	MH 400

Paper file applications and supporting documentation were obtained for each site. The data in the application files were reviewed and compared to the program tracking database and onsite survey observations. Discrepancies were noted and corrected for the impact evaluation. These discrepancies are reported in Table 9. Note, 2 of the projects in the sample were ineligible for the program, since they did not replace HID lighting systems.

Table 9. Tracking System and Paper File Discrepancies

State	Site	Discrepancy
NC	3	Pre fixtures not replaced one for one
	6	Pre fixtures not replaced one for one
	7	Pre fixtures not replaced one for one
	8	Pre fixtures not replaced one for one
	9	Pre fixtures not replaced one for one
	10	Pre fixtures not replaced one for one
	11	4 lamp T-8 fixtures indicated on application; but 2 lamp HO T-5 fixtures installed.
	12	Application operating hours > 8760
	12	Pre fixtures not replaced one for one
	16	4 lamp T-8 fixtures indicated on application, but 6 lamp T-8 fixtures installed. Replaced incandescent fixtures; program rules require metal halide.
	20	Application fixture count does not match survey
SC	1	4 lamp T-8 fixtures indicated on application, but 6 lamp T-8 fixtures installed
	3	Replaced fluorescent fixtures; program rules require metal halide.
	5	5 lamp T-8 fixtures indicated on application, but 6 lamp T-8 fixtures installed. 5 lamp fixture does not exist.
	6	Application fixture count does not match survey

	13	Combination of 6 and 8 lamp T-8 fixtures indicated on application, but only 6 lamp T-8 fixtures installed

Fixture watts reported in the manufacturer's catalogs (where available) were averaged and compared to the standard assumptions used in program design for several popular fixture types. This comparison is shown in Figure 7.

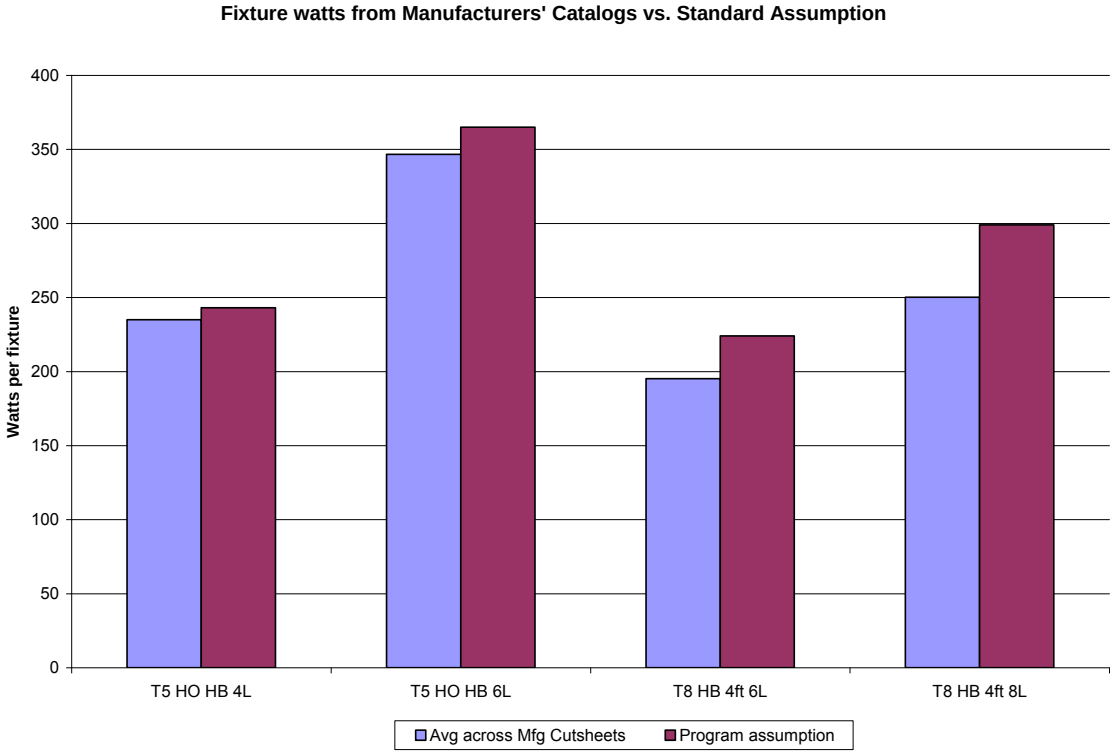

Figure 7. Comparison of Installed Fixture Watts from Manufacturers vs. Standard Assumptions

These data are also shown in Table 10.

Table 10. Comparison of Manufacturer's Fixture Watts with Standard Program Assumptions for High Bay Fixtures

Fixture	n	Program Assumption	Avg across Mfg Cutsheets
T5 HO HB 4L	4	234.0	235.0
T5 HO HB 6L	4	365.0	346.7
T8 HB 4ft 6L	26	226.0	195.1
T8 HB 4ft 8L	6	299.0	250.1

The average fixture watts from the manufacturer's catalogs matched the program design assumptions fairly well for T5 HO 4 lamp fixtures. The program design used higher

(more conservative) assumptions for fixture watts for the T5 HO 6 lamp and the T8 4 ft 6 and 8 lamp fixtures.

The ability of the program applicants to accurately report the fixture watts on the program application was investigated. A comparison of the fixture watts on the application vs. the manufacturer's catalog data is shown in Figure 8 through Figure 10.

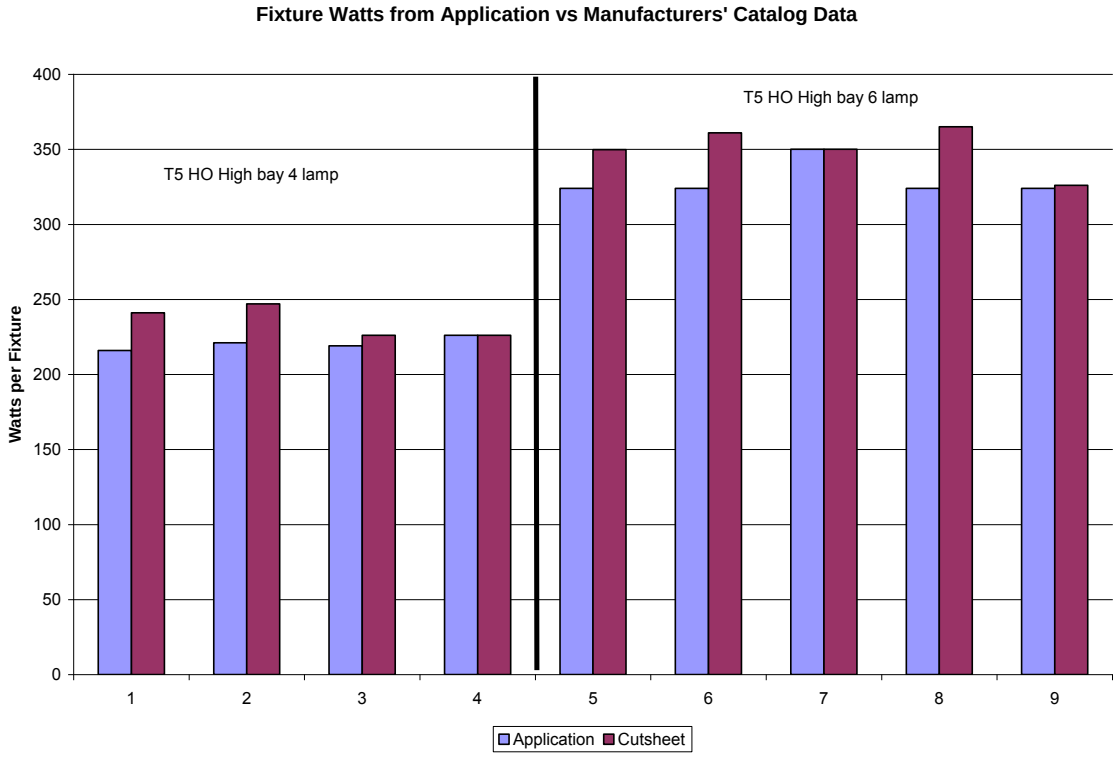

Figure 8. Comparison of Fixture Watts from Applications vs. Manufacturers' Catalog Data

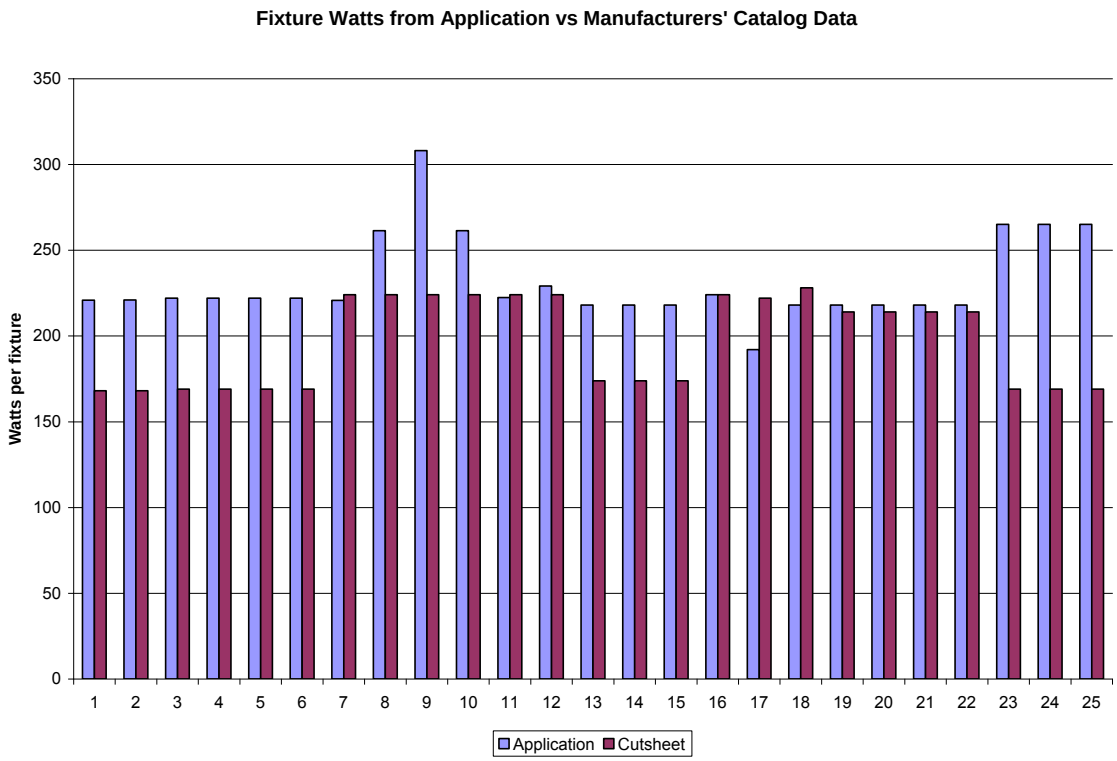

Figure 9. Comparison of Fixture Watts from Applications vs. Manufacturers' Catalog Data

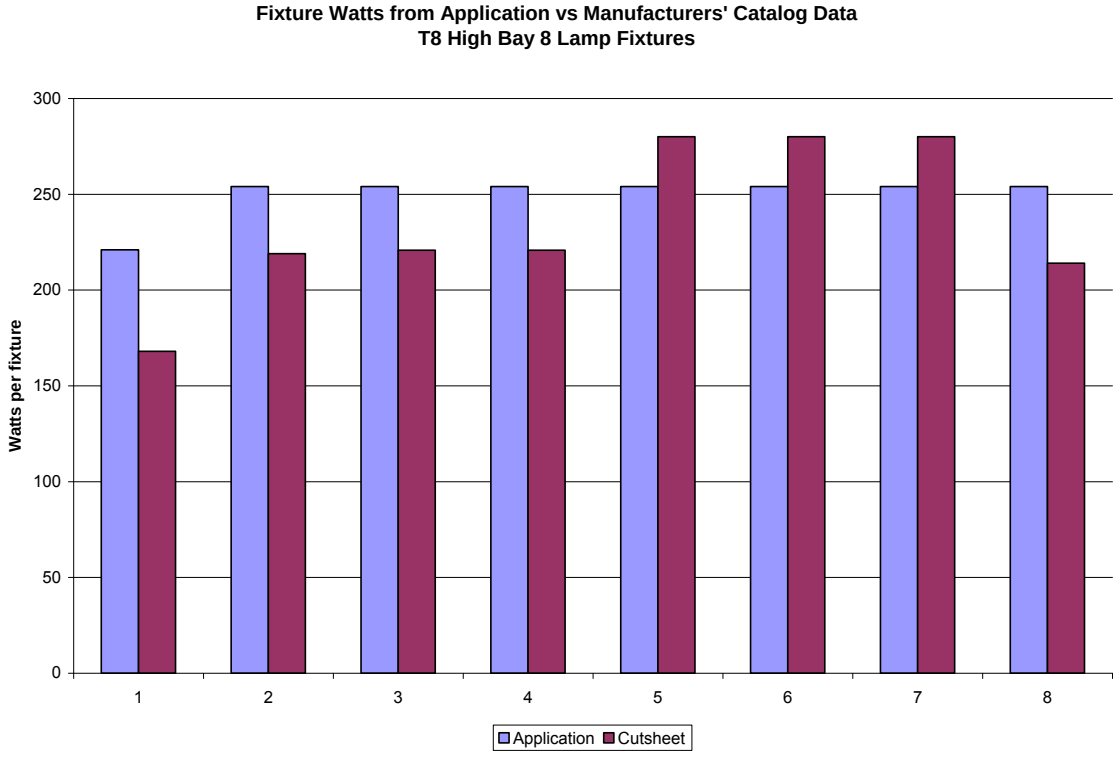

Figure 10. Comparison of Fixture Watts from Applications vs. Manufacturers' Catalog Data

Customer self reports of installed fixture watts varied widely from the data reported in the manufacturer's catalogs.

The fixture quantities installed at the sampled sites along with the number of light loggers deployed are shown in Table 11 and Table 12. Light loggers were deployed to monitor the on/off behavior of the lighting systems based on the circuiting and switching of the lighting systems. Due to group switching of multiple high bay fixtures, it was possible to monitor the on/off behavior of many fixtures with each light logger.

Table 11. Logger Installations at NC M&V Study Sites

Site	Business Type	Total fixtures rebated	Loggers installed
1	Education K-12	48	4
2	Public Assembly/Church	20	2
3	Public Assembly/Church	20	2
4	Public Assembly/Church	25	3
5	Public Assembly/Church	12	2
6	Retail (non-mall)	503	5
7	Retail (non-mall)	580	5
8	Retail (non-mall)	477	5
9	Retail (non-mall)	580	5
10	Retail (non-mall)	589	5
11	Retail (non-mall)	576	6
12	Industrial	115	5
13	Retail (non-mall)	48	4
14	Retail (non-mall)	66	5
15	Retail (non-mall)	49	4
16	Education K-12	15	2
17	Industrial	80	4
18	Retail (non-mall)	49	3
19	Education K-12	42	3
20	Education K-12	60	6

Table 12. Logger Installations at SC M&V Study Sites

Site	Business Type	Total fixtures rebated	Loggers installed
1	Warehouse	16	2
2	Warehouse	54	3
3	Industrial	259	4
4	other-mass	20	2
5	Retail (non-mall)	65	4
6	Industrial	296	0[8]
7	Office	66	5

[8] Lighting operation verified as always on (8760 hr per year). Logging not required.

Site	Business Type	Total fixtures rebated	Loggers installed
8	Industrial	40	2
9	Warehouse	54	4
10	Industrial	60	4
11	Retail (non-mall)	59	4
12	Retail (non-mall)	55	4
13	Retail (non-mall)	65	3
14	Retail (non-mall)	48	4
15	Retail (non-mall)	574	5

The light logger data were downloaded by the Duke Energy contractors, with assistance from Duke Energy evaluation staff. These data were processed by engineers from Architectural Energy Corporation. The results are shown in Table 13 and Table 14.

Table 13. NC Lighting Logger Study Results

Site	Business Type	Application self reported annual operating hours	Logger study annual operating hours	Ratio logged / self report	Coincident demand factor
1	Education K-12	2,400	3,285	1.37	0.88
2	Public Assembly/Church	2,416	3,048	1.26	0.50
3	Public Assembly/Church	2,416	2,213	0.92	0.73
4	Public Assembly/Church	2,416	2,673	1.11	0.48
5	Public Assembly/Church	2,416	3,354	1.39	0.92
6	Retail (non-mall)	5,668	7,774	1.37	1.00
7	Retail (non-mall)	6,000	6,216	1.04	1.00
8	Retail (non-mall)	5,880	6,414	1.09	1.00
9	Retail (non-mall)	5,269	6,321	1.20	1.00
10	Retail (non-mall)	5269	8,184	1.55	1.00
11	Retail (non-mall)	5,269	6,651	1.26	1.00
12	Industrial	16,000	2,428	0.15	0.70
13	Retail (non-mall)	4,576	6,060	1.32	0.98
14	Retail (non-mall)	4,576	6,587	1.44	1.00
15	Retail (non-mall)	4,576	4,991	1.09	1.00
16	Education K-12	2,400	840	0.35	0.02
17	Industrial	8,760	7,537	0.86	0.94
18	Retail (non-mall)	4,500	5,101	1.13	1.00
19	Education K-12	2,500	2,399	0.96	0.92
20	Education K-12	2,500	2,386	0.85	0.87
	Average			0.98	

Table 14. SC Lighting Logger Study Results

Site	Business Type	Application self reported annual operating hours	Logger study annual operating hours	Ratio logged / self report	Coincident demand factor

Site	Business Type	Application self reported annual operating hours	Logger study annual operating hours	Ratio logged / self report	Coincident demand factor
1	Warehouse	2,600	2,578	0.99	0.90
2	Warehouse	2,500	3,065	1.23	1.00
3	Industrial	2,600	2,917	1.12	0.85
4	other-mass	3,358	2,768	0.82	0.95
5	Retail (non-mall)	4,500	3,597	0.80	0.98
6	Industrial	6,240	8,760	1.40	1.00
7	Office	4,250	4,775	1.12	0.97
8	Industrial	5,760	5,369	0.93	0.60
9	Warehouse	2,860	2,628	0.92	0.95
10	Industrial	8,600	8,600	1.00	1.00
11	Retail (non-mall)	4,576	5,050	1.10	1.00
12	Retail (non-mall)	4,576	6,309	1.38	1.00
13	Retail (non-mall)	4,576	8,726	1.91	1.00
14	Retail (non-mall)	4,576	5,671	1.24	0.95
15	Retail (non-mall)	5,269	6,767	1.28	0.95
	Average			1.15	

On average, the light logger study predicted about 2% fewer operating hours in NC and 15% more hours in SC than the customer self reports.

The light logger results were combined with the verified fixture counts and verified installed fixture watts to estimate the actual energy and peak demand savings, using equation as shown below.

$kWh = (Watts_{base} – Watts_{ee}) / 1000 \times hours \times (1+WHF_e)$

$kW = (Watts_{base} – Watts_{ee}) / 1000 \times (1+WHF_d)$

where:

$Watts_{base}$ = baseline fixture watts
$Watts_{ee}$ = efficient fixture watts
hours = annual lighting operating hours
WHF_e = waste heat factor for energy
WHF_d = waste heat factor for demand

Waste heat factors were calculated using building energy simulation models derived from the commercial building prototypes used in the California Database for Energy Efficiency Resources (DEER) study[9], with adjustments make for local building practices and climate. The commercial prototypes were using long-term average weather data for

[9] Itron, 2005. "2004-2005 Database for Energy Efficiency Resources (DEER) Update Study, Final Report," Itron, Inc., J.J. Hirsch and Associates, Synergy Consulting, and Quantum Consulting. December, 2005. Available at http://eega.cpuc.ca.gov/deer.

Charlotte, Asheville and Greenville. The results of the interactive effects simulations are shown in Table 15.

Table 15. Results of HVAC Interactive Effects Simulations

Building	City	WHF_e	WHF_d
Assembly	Asheville	0.137	0.171
	Charlotte	0.187	0.237
	Greenville	0.176	0.216
Big Box Retail	Asheville	0.152	0.241
	Charlotte	0.177	0.258
	Greenville	0.165	0.259
Light Industrial	Asheville	0.084	0.194
	Charlotte	0.124	0.165
	Greenville	0.112	0.185
Primary School	Asheville	0.075	0.224
	Charlotte	0.126	0.254
	Greenville	0.118	0.239
Small Office	Asheville	0.139	0.080
	Charlotte	0.164	0.080
	Greenville	0.150	0.077
Warehouse	Asheville	0.079	0.047
	Charlotte	0.096	0.030
	Greenville	0.084	0.062

These results of the calculations are shown in Table 16 and Table 18 as Eval kWh and Eval kW. These results were compared to the tracked savings based on the fixture counts and standard per fixture kW and kWh savings estimates from DSMore[10]. The ratio of the evaluated savings to the program planning estimated savings is expressed as a realization rate (RR) for both kWh and kW.

Table 16. Results of NC High Bay Lighting M&V Study

Site	Business Type	Eval kWh	DSMore kWh	RR (kWh)	Eval kW	DSMore kW	RR (kW)
1	Education K-12	50,959	46,478	1.10	17	12	1.41
2	Public Assembly/Church	20,691	21,093	0.98	7	6	1.27
3	Public Assembly/Church	15,912	21,093	0.75	7	6	1.35
4	Public Assembly/Church	22,686	26,367	0.86	9	7	1.27
5	Public Assembly/Church	13,661	12,656	1.08	4	3	1.27
6	Retail (non-mall)	737,526	530,494	1.39	101	140	0.72
7	Retail (non-mall)	811,781	611,703	1.33	140	161	0.87
8	Retail (non-mall)	519,227	503,073	1.03	86	133	0.65
9	Retail (non-mall)	807,745	611,703	1.32	138	161	0.85

[10] DSMore inputs accept non-coincident kW savings. Coincidence factors are applied during the DSMore run. Demand savings are show as non-coincident kW for consistency.

Site	Business Type	Eval kWh	DSMore kWh	RR (kWh)	Eval kW	DSMore kW	RR (kW)
10	Retail (non-mall)	1,131,908	621,195	1.82	148	164	0.90
11	Retail (non-mall)	873,640	607,484	1.44	140	160	0.88
12	Industrial	233,099	55,938	4.17	103	15	6.97
13	Retail (non-mall)	88,572	42,333	2.09	16	11	1.40
14	Retail (non-mall)	133,375	59,590	2.24	22	16	1.38
15	Retail (non-mall)	74,893	44,078	1.70	16	12	1.38
16	Education K-12	3,916	9,819	0.40	5	3	2.00
17	Industrial	101,627	38,914	2.61	14	10	1.37
18	Retail (non-mall)	67,982	51,678	1.32	14	14	1.05
19	Education K-12	10,666	20,430	0.52	5	5	0.92
20	Education K-12	16,100	61,098	0.26	8	16	0.47
	Total	5,735,966	3,997,216	1.43	1,000	1,054	0.95

Table 17. Results of SC High Bay Lighting M&V Study

Site	Business Type	Eval kWh	DSMore kWh	RR (kWh)	Eval kW	DSMore kW	RR (kW)
1	Warehouse	4,697	7,783	0.60	2	2	0.87
2	Warehouse	40,265	56,952	0.71	13	15	0.86
3	Industrial	552,861	169,547	3.26	202	45	4.51
4	other-mass	5,860	9,728	0.60	2	3	0.86
5	Retail (non-mall)	62,939	68,553	0.92	19	18	1.05
6	Industrial	150,361	143,980	1.04	18	38	0.48
7	Office	82,276	69,608	1.18	16	18	0.88
8	Industrial	49,679	40,732	1.22	10	11	0.92
9	Warehouse	35,239	54,988	0.64	13	15	0.90
10	Industrial	131,413	61,098	2.15	16	16	1.01
11	Retail (non-mall)	81,613	53,243	1.53	17	14	1.24
12	Retail (non-mall)	84,836	49,025	1.73	15	13	1.12
13	Retail (non-mall)	161,470	58,880	2.74	20	16	1.29
14	Retail (non-mall)	74,850	43,024	1.74	14	11	1.26
15	Retail (non-mall)	1,147,725	605,375	1.90	183	160	1.15
	Total	2,666,083	1,492,515	1.79	561	394	1.43

In North Carolina, the average realization rates for kWh and kW for the sample are 1.43 and 0.95 respectively. Thus, the evaluation study estimated about 43% more kWh savings and about 5% less coincident demand savings than the program planning assumptions.

In South Carolina, the average realization rates for kWh and kW for the sample are 1.79 and 1.43 respectively. Thus, the evaluation study estimated about 79% more kWh savings and about 43% more coincident demand savings than the program planning assumptions.

Table 18. Results of NC High Bay Lighting M&V Study – Eligible Fixtures Only

Site	Business Type	Eval kWh	DSMore kWh	RR (kWh)	Eval kW	DSMore kW	RR (kW)
1	Education K-12	50,959	46,478	1.10	17	12	1.41
2	Public Assembly/Church	20,691	21,093	0.98	7	6	1.27
3	Public Assembly/Church	15,912	21,093	0.75	7	6	1.35
4	Public Assembly/Church	22,686	26,367	0.86	9	7	1.27
5	Public Assembly/Church	13,661	12,656	1.08	4	3	1.27
6	Retail (non-mall)	1,063,521	530,494	2.00	146	140	1.05
7	Retail (non-mall)	980,655	611,703	1.60	169	161	1.05
8	Retail (non-mall)	832,212	503,073	1.65	139	133	1.05
9	Retail (non-mall)	975,779	611,703	1.60	166	161	1.03
10	Retail (non-mall)	1,311,059	621,195	2.11	171	164	1.05
11	Retail (non-mall)	1,042,053	607,484	1.72	167	160	1.05
12	Industrial	240,097	55,938	4.29	106	15	7.18
13	Retail (non-mall)	88,572	42,333	2.09	16	11	1.40
14	Retail (non-mall)	133,375	59,590	2.24	22	16	1.38
15	Retail (non-mall)	74,893	44,078	1.70	16	12	1.38
16	Education K-12	0	9,819	0.00	0	3	0.00
17	Industrial	101,627	38,914	2.61	14	10	1.37
18	Retail (non-mall)	67,982	51,678	1.32	14	14	1.05
19	Education K-12	10,666	20,430	0.52	5	5	0.92
20	Education K-12	16,100	61,098	0.26	8	16	0.47
	Total	7,062,499	3,997,216	1.77	1,203	1,054	1.14

Table 19. Results of SC High Bay Lighting M&V Study – Eligible Fixtures Only

Site	Business Type	Eval kWh	DSMore kWh	RR (kWh)	Eval kW	DSMore kW	RR (kW)
1	Warehouse	4,697	7,783	0.60	2	2	0.87
2	Warehouse	40,265	56,952	0.71	13	15	0.86
3	Industrial	0	169,547	0.00	0	45	0.00
4	other-mass	5,860	9,728	0.60	2	3	0.86
5	Retail (non-mall)	62,939	68,553	0.92	19	18	1.05
6	Industrial	309,159	143,980	2.15	38	38	0.99
7	Office	82,276	69,608	1.18	16	18	0.88
8	Industrial	49,679	40,732	1.22	10	11	0.92
9	Warehouse	35,239	54,988	0.64	13	15	0.90
10	Industrial	131,413	61,098	2.15	16	16	1.01
11	Retail (non-mall)	81,613	53,243	1.53	17	14	1.24
12	Retail (non-mall)	84,836	49,025	1.73	15	13	1.12
13	Retail (non-mall)	161,470	58,880	2.74	20	16	1.29
14	Retail (non-mall)	74,850	43,024	1.74	14	11	1.26
15	Retail (non-mall)	1,293,613	605,375	2.14	207	160	1.30
	Total	2,417,909	1,492,515	1.62	402	394	1.02

When ineligible fixtures are removed, the total realization rates for kWh and kW for the sample change to 1.77 and 1.14 respectively in NC and 1.62 and 1.02 respectively in SC. The increase in realization rate in North Carolina is driven mostly by the sites where additional fixtures were installed beyond a one for one change out, causing an increase in connected lighting load in the post retrofit case. When these fixtures are removed from the analysis, the energy savings increase. The decrease in realization rate in South Carolina is driven mostly by site 3, which had an invalid existing fixture type, causing the savings for that site to go to zero.

Total Gross and Net Impacts

The total first year gross savings are tabulated by measure type in Table 20 and Table 21. Note, only high bay lighting measures were adjusted at this time.

Table 20. Total First Year Gross Energy Savings for Lighting Measures in North Carolina

Measure type	Program Tracking kW	Program Tracking kWh	kW realization Rate	kWh realization Rate	Evaluated Gross kW	Evaluated Gross kWh
High bay	5,681	21,553,115	**114%**	**177%**	6,477	38,149,014
Linear Fluorescent	1,392	5,225,489	100%	100%	1,392	5,225,489
CFL	2,219	8,363,758	100%	100%	2,219	8,363,758
Occupancy Sensor	615	2,980,754	100%	100%	615	2,980,754
Other lighting	11	98,753	100%	100%	11	98,753
Total	9,918	38,221,869	108%	143%	10,713	54,817,767

Table 21. Total First Year Gross Energy Savings for Lighting Measures in South Carolina

Measure type	Program Tracking kW	Program Tracking kWh	kW realization Rate	kWh realization Rate	Evaluated Gross kW	Evaluated Gross kWh
High bay	2,717	10,299,462	**102%**	**162%**	2,772	16,685,128
Linear Fluorescent	378	1,423,242	100%	100%	378	1,423,242
CFL	89	336,146	100%	100%	89	336,146
Occupancy Sensor	530	2,555,682	100%	100%	530	2,555,682
Other lighting	0	4,445	100%	100%	0	4,445
Total	3,715	14,618,977	101%	144%	3,770	21,004,643

The first year net savings are calculated assuming a freeridership level of 70% as described in the Free-ridership Section above.

Table 22. Total First Year Net Energy Savings for Lighting Measures in North Carolina

Measure type	Evaluated Gross kW	Evaluated Gross kWh	Net to Gross Ratio	Evaluated Net kW	Evaluated Net kWh
High bay	6,477	38,149,014	0.7	4,534	26,704,309
Linear Fluorescent	1,392	5,225,489	0.7	974	3,657,842
CFL	2,219	8,363,758	0.7	1,553	5,854,631
Occupancy Sensor	615	2,980,754	0.7	431	2,086,528
Other lighting	11	98,753	0.7	7.7	69,127
Total	10,713	54,817,767		7,499	38,372,437

Table 23. Total First Year Net Energy Savings for Lighting Measures in South Carolina

Measure type	Evaluated Gross kW	Evaluated Gross kWh	Net to Gross Ratio	Evaluated Net kW	Evaluated Net kWh
High bay	2,772	16,685,128	0.7	1,940	11,679,590
Linear Fluorescent	378	1,423,242	0.7	265	996,269
CFL	89	336,146	0.7	62	235,302
Occupancy Sensor	530	2,555,682	0.7	371	1,788,977
Other lighting	0	4,445	0.7	0	3,111
Total	3,770	21,004,643		2,639	14,703,250

Lifecycle savings were estimated by applying the following effective useful life (EUL) assumptions[11] to each measure.

Table 24. Effective Useful Life for Lighting Measures

Measure Type	Measure	EUL (years)
Lighting	CFL	12
	Exit sign	15
	HiBay Lighting	10
	Linear Fluorescent	10
	Occupancy Sensor	8
	Other lighting	10

Applying the EUL estimates listed above to each measure, the lifecycle gross and net kWh savings are shown below:

[11] EUL data supplied by FES

Table 25. Lifecycle Gross and Net Savings for the Lighting Component of NC Commercial Smart $aver® Prescriptive Program for 11 months of Program Operation Ending April 30, 2010

Result	Value
Tracking System Lifecycle Gross Savings	392,984,694
Evaluated Lifecycle Gross kWh savings	558,943,680
Evaluated Lifecycle Net kWh savings	391,260,576

Table 26. Lifecycle Gross and Net Savings for the Lighting Component of SC Commercial Smart $aver® Prescriptive Program for 11 months of Program Operation Ending April 30, 2010

Result	Value
Tracking System Lifecycle Gross Savings	141,750,695
Evaluated Lifecycle Gross kWh savings	205,607,359
Evaluated Lifecycle Net kWh savings	143,925,151

Appendix A: Vendor Interview Instrument

Name: _____

Title: _____

Position description and general responsibilities:

_____

_____

_____

We are conducting this interview to obtain your opinions about and experiences with the Smart $aver® Prescriptive Program. We'll talk about your understanding of the Smart $aver® Program and its objectives, your thoughts on improving the program, and the technologies the program covers. The interview will take about an hour to complete.

Understanding the Program

We would like to ask you about your understanding of the Smart $aver® program. We would like to start by first asking you to…

1. Please review for me how you are involved in the program and the steps you take in the participation process. Walk me though the typical steps you take to help a customer become aware of the program, screen the customer for eligibility for this program and what you do to receive or help the customer receive the program incentive.

2. What is your overall opinion of the program?

3. What specifically do you like about the program or the way it operates?

4. What do you dislike about the program, or what is it that you would like to see changed and why is that change needed?

5. What kinds of issues have come up in the Smart $aver® program?

6. What are the different types of reactions you see from customers when you tell them about the program?

7. Have you heard of any customer complaints that are in any way associated with this program?

8. Have callbacks increased due to the program technologies?

Program Design and Design Assistance

9. Do you feel that the right mix and types of technologies and equipment are covered by the program?

10. Tell me about how the customers react to the incentive levels.

11. Are the incentive levels appropriate?

12. What would the incentive need to be in order to have more than 80 percent of the market go with the energy efficient model?

13. Are there other technologies or energy efficient systems that you think should be included in the program?

14. Are there components that are now included that you feel should not be included in the prescriptive program? What are they and why should they not be included?

Reasons for Participation in the Program

We would like to better understand why contractors become partners in the Smart $aver® Program.

15. How long have you been a partner in the Smart $aver® Program?

16. What are your primary reasons for participating in the program? Why do you continue to be a partner? If prompts are needed… Is this a wise business move for you, is it something you believe in professionally, is it that it provides a service to your customers, or other reasons?

17. Why do you think other trade allies become partners in the program?

18. What are the reasons why trade allies like yourself would not want to become partners in the program?

19. Has this program made a difference in your business? How? Be as specific as you can and talk sales volumes, profits, customer relationships and any other aspect that you think is important.

20. What does Duke Energy need to do to get more contractors and trade allies to participate in this program?

Program Participation Experiences

The next few questions ask about the process for submitting participation forms and obtaining the incentive payments.

21. Let's start with Marketing. How can marketing be improved?

22. And what about the application and processing aspects?

23. How about the payment and incentive processing aspects?

24. How long does it take between the time that you apply for your incentive, to the time that you and/or your customer receive the payments? Is this a reasonable amount of time? What should it be? Why?

25. Do you have the right amount of materials such as forms, information sheets, brochures or marketing materials that you need to effectively show and sell your Smart $aver® technologies? What else do you need?

26. Do you feel that communications between you and Duke's Smart $aver® program staff is adequate? How might this be improved?

27. What do you think are the primary benefits to the people who buy Smart $aver®-eligible measures? Are there other benefits that are important to a potential customer?

Market Impacts and Effects

28. How do you make your customers aware of the Program? (if not covered earlier)

29. Are your customers more satisfied with the higher efficiency equipment? Why or why not?

30. Do you have fewer calls or more calls to correct problems with the Smart $aver® technologies?

31. Do you market or sell the Smart $aver® equipment differently than your other equipment? How?

32. Has the program influenced you to carry other energy efficient equipment that is not rebated through the program?

33. If yes, what do you now carry?

34. If yes, About how many of these units did you install/sell in the last year?

35. Do you think the program is making more people aware of the benefits of being more energy efficient?

36. Have you not iced changes in your sales patterns where you think customers are asking for more energy efficient equipment? If yes… Why do you think this is / or is not happening?

37. Are programs like Smart $aver® having an impact on what models of products are being manufactured and distributed to distributors, dealers, retailers and contactors?

Net to Gross Questions

38. Has the program influenced your decision to market or sell more high efficiency measures than you would have without the program? If yes, to what extent?

39. How much difference does the program make to the customer's decision to move up to the more energy efficient model?

40. What percent of your customers fall in to the each of these groups,
    a. Makes a great difference and allows them to obtain the more efficient model;
    b. Makes somewhat of a difference in their choice;
    c. Makes little or no difference and does not affect their choice?

41. Can you tell me why this occurs for each of the three groups above?

42. We would like to obtain an understanding of the program's effects on sales of high efficiency models. We would like your best estimate of the number of units your company sold over the last 12 months; the percent of sales that were high efficiency units, and the percent of the high efficiency models that got a Duke rebate. Estimates are fine, we are not looking for exact numbers, but good estimates will help us understand the impacts of the program and the potential for additional sales.

I would like to start with <<*Technology 1*>>

a. Total units sold: ___ Percent high EE: ___% Percent getting a Duke rebate: ___

Now let's go to <<*Technology 2*>>

b. Total units sold: ___ Percent high EE: ___% Percent getting a Duke rebate: ___

And for <<*Technology 3*>>

c. Total units sold: ___ Percent high EE: ___% Percent getting a Duke rebate: ___

And for <<*Technology 4*>>

d. Total units sold: ___ Percent high EE: ___% Percent getting a Duke rebate: ___

43. Programs such as these might have the potential to increase sales of high efficiency products in two ways. One is through rebates and incentives that reduce the cost barrier. The other is via market effects in which programs can impact customer demand as well as the manufacturing and distribution process. To help us understand these potential changes we would like to know if the program may have influenced your overall ordering, stocking and sales practices. Were you selling the same number of high efficiency models before you became a Duke partner, or has the program influenced the total number of high efficiency units you sell?

44. *If influenced:* How as the Duke program changed the number of units you sell?

45. What was your total volume of high efficiency <*technology a*> unit sales before the program and what is it now? Before _____ After _____

46. What was your total volume of high efficiency <*technology b*> unit sales before the program and what is it now? Before _____ After _____

47. What was your total volume of high efficiency <*technology c*> unit sales before the program and what is it now? Before _____ After _____

48. There are no plans to terminate the program, but we would like to know how the program affects contractors. If the program were to be discontinued, what would happen to the volume of sales of the high efficiency models?
49. How would this change your ordering and stocking practices?

50. If the program were not offered, would you need to structure pricing differently to make up for the program loss? If so, how?

51. In your opinion is the Smart $aver® program still needed? Why?

Recommended Changes from the Participating Contractors

52. Are there any other changes that you would recommend to Duke Energy for the Smart $aver® Program that we have not already discussed?

53. If you could make any changes to this program, what changes would you make to this program?

Appendix B: Participant Survey Instrument

Name: _____

Title: _____

Hello, my name is _____. I am calling on behalf of Duke Energy to conduct a customer survey about the Smart $aver® Incentive Program. May I speak with _____ please?
If person talking, proceed. If person is called to the phone reintroduce.
If not home, ask when would be a good time to call and schedule the call-back:

Call back 1: Date: _____, Time: _____ ❑AM or ❑PM
Call back 2: Date: _____, Time: _____ ❑AM or ❑PM
Call back 3: Date: _____, Time: _____ ❑AM or ❑PM
Call back 4: Date: _____, Time: _____ ❑AM or ❑PM
Call back 5: Date: _____, Time: _____ ❑AM or ❑PM
Call back 6: Date: _____, Time: _____ ❑AM or ❑PM
Call back 7: Date: _____, Time: _____ ❑AM or ❑PM
❑ Contact dropped after seventh attempt.

We are conducting this survey to obtain your opinions about the Smart $aver® Incentive Program in which you participated. We are not selling anything. The survey will take about 10-15 minutes and your answers will be confidential, and will help us to make improvements to the program to better serve others. May we begin the survey?

Note: If this is not a good time, ask if there is a better time to schedule a callback.

1. **Do you recall participating in the Smart $aver® Program?**

1. ❑ Yes, *begin* → *Skip to Q3.*
2. ❑ No,
99. ❑ DK/NS

This program was provided through Duke Energy. In this program, your company purchased a new energy efficient motor, pump, HVAC system or component, or lighting system. Duke Energy provided an incentive of <$xxx> for purchasing the qualifying item.

Do you remember participating in this program?

1. ❑ Yes, *begin* → *Go to Q2.*
2. ❑ No,
99. ❑ DK/NS

If No or DK/NS terminate interview and go to next participant.

2. **Our records indicate that you purchased a** <incented item> **Is this correct? If not, what was the rebated technology that you purchased?**

1. ❑ Correct
2. ❑ Pump
3. ❑ Motor
4. ❑ HVAC
5. ❑ Lighting
6. ❑ Refrigeration
7. ❑ Other specify:
   _____

3. **Please think back to the time when you were deciding to buy the energy saving** <incented item>, **perhaps recalling things that occurred in your company shortly before and after your purchase. What kinds of factors motivated you to purchase energy saving** < incented item>? *(do not read list, place a "1" next to the response that matches best)*

1. ____ Old equipment didn't work
2. ____ Old equipment working poorly
3. ____ The program incentive
4. ____ The program technical assistance
5. ____ Recommendation of someone else (*Probe*: **Who?**_____)
6. ____ Wanted to reduce energy costs
7. ____ The information provided by the Program
8. ____ Past experience with this program
9. ____ Because of past experience with another Duke Energy program
10. ____ Recommendation from other utility program
    i. (*Probe*: **What program?** _____)
11. ____ Recommendation of dealer/contractor
12. ____ Advertisement in newspaper (*Probe:* **For what program?** _____)
13. ____ Radio advertisement (*Probe:* **For what program?** _____)
14. ____ Other (SPECIFY)
    _____

15. ____ Don't know/don't remember/not sure (DK/NS)

If multiple responses: 2.a. **Were there any other reasons?** *(number responses above in the order they are provided - Repeat until 'no' response.)*

4. **Did you get this** < incented item> **to replace an existing** < incented item>**?**

1. ❑ Yes – *skip to question 8*
2. ❑ No
3. ❑ DK/NS – *skip to question 11*

5. **Is this** < incented item> **the first you have ever purchased for your company?**

1. ❑ Yes – *skip to question 11*
2. ❑ No
3. ❑ DK/NS – *skip to question 11*

6. **Did you get this** < incented item> **because you wanted to add another/more** < incented item> **to your facility?**

1. ❑ Yes
2. ❑ No
3. ❑ Don't Know – *skip to question 11*

7. **About how old was the** < incented item> **you replaced?**

1. ❑ Less than 5 years old
2. ❑ 5 to less than 10 years old
3. ❑ 10 to less than 20 years old
4. ❑ 20 years to less than 30 years old
5. ❑ 30 or more years old
99. ❑ Don't Know

8. **Was the old** < incented item> **working or not working?**

1. ❑ Yes, working
2. ❑ No, not working – *skip to question 11*
3. ❑ Don't Know

9. **Was the old** < incented item> **in good, fair, or poor working condition?**

1. ❑ Good
2. ❑ Fair
3. ❑ Poor
4. ❑ Don't Know

10. Who filled out the program incentive forms for your company?

a. ❑ I did
b. ❑ Someone from my company did
c. ❑ The contractor
d. ❑ The salesperson
e. ❑ Someone from Duke Energy

11. Who submitted the forms to Duke Energy?

a. ❑ I did (customer)
b. ❑ Someone from my company did
c. ❑ The contractor
d. ❑ The salesperson
e. ❑ Someone from Duke Energy

11a. If they filled it out. **Was the incentive form easy to understand?**

1. ❑ Yes
2. ❑ No
3. ❑ Some of it
99. ❑ DK/NS

If no or some of it, 8b. **Do you remember what it was that was not clear or which part of it was difficult?**

_____

_____

12. **Did you have any problems receiving the incentives?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes, 9b. **Please explain the problem and how it was resolved. Was it resolved to your satisfaction?**

_____

_____

Free-Ridership Questions

13. **At the time that you first heard about the Smart $aver® Program from Duke Energy, had you…?**

1. ❑ **Already been thinking about purchasing** < incented item>
2. ❑ **Already begun collecting information about** < incented item> **or**
3. ❑ **Already decided to buy the** < incented item>**?**
4. ❑ Don't Know

14. Just to be sure I understand, did you have specific plans to install the high efficiency < incented item**> before you heard about the program?**

1. ❑ Yes
2. ❑ No – *skip to question 14*
3. ❑ Don't Know – *skip to question 14*

15. **Did you have to make any changes to your existing equipment replacement plans in order to receive this rebate through the Smart $aver® Program?**

1. ❑ Yes
2. ❑ No
3. ❑ Don't Know

16. **If the rebate from Duke Energy's Smart $aver® Program had not been available, would you still have:**

16a. **Purchased the same type of** < incented item>**?**

1. ❑ Yes
2. ❑ No – *skip to question 16*
3. ❑ Don't Know – *skip to question 16*

16b. **Purchased the same energy efficiency of** < incented item>?

1. ❑ Yes
2. ❑ No
3. ❑ Don't Know

16c. **Purchased the** < incented item> **at the same time that you did?**

1. ❑ Yes – *skip to question 15*
2. ❑ No
3. ❑ Don't Know – *skip to question 15*

16d. **Purchased the** < incented item> **earlier than you did, or later?**

1. ❑ Earlier
2. ❑ Same Time
3. ❑ Later
4. ❑ Don't Know – *skip to question 15*

16e. **How much <earlier/later>?**

1. _____ years and/or _____months
2. ❑ Don't Know

17. **If the rebate from the Smart $aver® Program had not been available, would you have done anything else differently?**

1. ❑ Yes
2. ❑ No
3. ❑ Don't Know

17a. **What would you have done differently?**

_____

_____

18. **On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have bought a less efficient** < incented item> **if you had not received any rebate from the program?**

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

I'm going to read several statements about how you came to choose your < incented item>**. On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with this statement?**

19**. If I had not had any assistance from the program, I would have paid the additional** <$xxx> **to buy the energy efficient** < incented item> **on my own?**

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

20. **The rebate from the Duke Energy Smart $aver® Program was a critical factor in my decision to purchase the high efficiency/energy efficient product.**

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

21**. I would have bought the same make and model of the** < incented item> **within one year of when I did even without the rebate from the Duke Energy Smart $aver® Program.**

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

22. **The rebate from the Duke Energy Smart $aver® Program was not necessary to cause me to purchase the higher efficiency product when your company bought the new** < incented item>**.**

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

Consistency Check & Resolution

23 will be asked only for those respondents who have a clear inconsistency between responses (i.e., all but one of the questions are at one end of the spectrum for free ridership while one question is at the other spectrum.) An algorithm will be provided after pretesting. The question responses that will be used to trigger 21 are:

- 14a (only for efficiency enhancement measures)
- 14b (only for incremental efficiency measures)
- 16 depending upon which version of the question they received
- 18
- 19
- 20

23. **Let me make sure I understand you. Earlier, you said <**inconsistency prompted by excel function**>, but that differs from some of your other responses. Please tell me in your own words what influence, if any, the program had on your decision to purchase and install the** < incented item> **at the time you did?**

_____
_____
_____
_____

Based on response, correct any above entries.

Spillover Questions

24. **Since you participated in the Smart $aver® Program, have you purchased and installed any other type of high efficiency equipment or made energy efficiency improvements at your company or at any other locations?**

1. ❑ Yes, only at this company
2. ❑ Yes, only at other locations
3. ❑ Yes, at both company and other locations
4. ❑ No
5. ❑ Don't Know

25. **What type and quantity of high efficiency equipment did you install on your own?** *PROBE TO GET EXACT TYPE AND QUANTITY AND LOCATION*

Type 1: _____	Quantity 1: _____	Location 1:_____
Type 2: _____	Quantity 2: _____	Location 2:_____
Type 3: _____	Quantity 3: _____	Location 3:_____
Type 4: _____	Quantity 4: _____	Location 4:_____

26. *For each type listed in 23 above,* **How do you know that this equipment is high efficiency? For example, was it Energy Star rated?**

Type 1: _____
Type 2: _____
Type 3: _____
Type 4: _____

I'm going to read a statement about this equipment that you purchased on your own. On a scale from 1-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statement.

27. **My experience with the Smart $aver® Program in** <2008, 2009> **influenced my decision to install different types of high efficiency equipment on my own.**

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

28. **What other actions, if any, have you taken in your company to save energy and reduce utility bills as a result of what you learned in this program?**
Response:1 _____

Response:2 _____

Response:3 _____

Response:4 _____

Now I am going to ask you some general satisfaction statements. On a scale from 1-10, with 0 indicating that you strongly disagree, and 10 indicating that you strongly agree, please rate the following statements.

29. The rebate form was easy to understand and complete.

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

If 7 or less, **How could this be improved**?_____

_____

30. The interactions and communications I had with Duke Energy staff was satisfactory.

1 2 3 4 5 6 7 8 9 10

❑ Not applicable

If 7 or less, **How could this be improved**?_____

_____

31. The rebate levels provided by the program

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

If 7 or less, **How could this be improved**?_____

_____

32. The time it took for you to receive your rebate

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

If 7 or less, **How could this be improved**?_____

_____

33. The number and kind of technologies covered in the program

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

If 7 or less, **How could this be improved**?_____

_____

34. The information you were provided explaining the program

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

If 7 or less, **How could this be improved**?_____

_____

35. **Overall I am satisfied with the program**.

1 2 3 4 5 6 7 8 9 10

❑ Don't Know

If 7 or less, **How could this be improved**?_____

_____

36. **What additional services would you like the program to provide that it does not now provide?**

Response: _____

_____

37. **Are there any other things that you would like to see changed about the program?**

Response: _____

38. **What do you think can be done to increase people's interest in participating in the Smart $aver® Program?**

Response:1 _____
Response:2 _____
Response:3 _____
Response:4 _____

39. **What do you like most about this program?**

Response: _____

40. **What do you like least about this program?**

Response: _____

Appendix C: Program Manager Interview Protocol

Name: _____

Title: _____

Position description and general responsibilities:

_____

_____

_____

We are conducting this interview to obtain your opinions about and experiences with the Smart $aver® Prescriptive program. We'll talk about the Smart $aver® Program and its objectives, your thoughts on improving the program, and the technologies the program covers. The interview will take about one to two hours to complete. May we begin?

Program Objectives

1. In your own words, please describe the Smart $aver® Program's current objectives. How have these changed over time?

2. In your opinion, which objectives do you think are best being met or will be met?

3. Are there any program objectives that are not being addressed or not being addressed as well as possible or that you think should have more attention focused on them? If yes, which ones? How should these objectives be addressed? What should be changed?

4. What market information, research or market assessments are you using to determine the best target markets and program opportunities, market barriers, delivery mechanisms and program approach?

5. In your opinion, should the program objectives be changed in any way due to technology-based, market-based, or management based conditions? What objectives would you change? What operational changes would you put into place, and how would it affect the results of the program?

Operational Efficiency

6. Please describe your role and scope of responsibility in detail. What is it that you are responsible for as it relates to this program?

7. Please review with us how the Smart $aver® operates relative to your duties, that is, please walk us through the processes and procedures and key events that allow you to currently fulfill your duties.

8. Have any recent changes been made to your duties? If so, please tell us what changes were made and why they were made. What are the results of the change? Do you feel that you were adequately prepared for these changes?

9. Describe the evolution of the Smart $aver® Program. How has the program changed since it was it first started?

10. Describe your participant tracking and data quality control process.

11. Do you have suggestions for improvements to the program that would increase participation rates or interest levels?

12. Do you have suggestions for improving or increasing energy impacts?

13. Thinking about how your program enrolls participants, what do you think is the level of freeridership for the Smart $aver® Prescriptive Program? (*That is, what percent of the measures rebated through the program would have been purchased and installed without the program's incentive?*)

14. What do you think can be done to lower the level of freeridership?

15. What do you think the level of spillover is for the Smart $aver® Program? *(That is, what percent of the high efficiency measures that are installed are, in some way, a result of the program's influence other than direct program participation?)*

16. What do you think can be done to increase the level of spillover?

17. Are you aware of projects moving forward with incentives when they shouldn't be eligible? (If yes…) Why were these projects approved? What can be done to stop this from happening?

18. Do you have suggestion for the making the program operate more smoothly or effectively?

Program Design & Implementation

19. *(If not captured earlier)* Please explain how the interactions between the contractors, customers, and Smart $aver's® management team work. Do you think these interactions or means of communication should be changed in any way? If so, how and why?

20. How do you determine what measures to include in the program and what levels of energy efficiency should be covered?

21. Should this be changed in any way?

22. How do you determine what the technology incentive levels should be?

23. Should this be changed in any way?

24. Are there things that you think can be done to make more trade allies interested in participating in the program and focus more on pushing high efficiency products to their customers?

25. Are key industry experts, trade professionals or peers used for assessing what the technologies or models should be included in the program? If so, how does this work?

26. Are key industry experts and trade professionals used in other advisory roles? If so how does this work and what kinds of support is obtained?

27. Describe Smart $aver's® contractor program orientation training and development approach. Are contractors getting adequate program training and program information? What can be done that could help improve contractor effectiveness? Can we obtain training materials that are being used?

28. In your opinion, did the incentives cover enough different kinds of energy efficient products?

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If no, 20b. What other products or equipment should be included?

29. How do you make sure that the best information and practices are being used in Smart $aver® operations?

30. What market information, research or market assessments are you using to determine the best target markets or market segments on which to focus?

31. What market information, research or market assessments are you using to identify market barriers, and develop more effective delivery mechanisms?

32. Overall, what about the Smart $aver® program works well and why?

33. What doesn't work well and why? Do you think this discourages participation or contractor interests?

34. Can you identify any market, operational or technical barriers that impede a more efficient program operation?

35. In what ways can these operations or operational efficiencies be improved?

36. In what ways can the program attract more participants?

37. *(If not collected above)* What market information, research or market assessments are you using to determine the best target markets and program opportunities, market barriers, delivery mechanisms and program approach?

38. If you could change anything about the Smart $aver® Program, what would you change and why?

39. Are there any other issues or topics you think we should know about and discuss for this evaluation?

Final Report

Evaluation of Duke Energy's Energy Assessment Program in North and South Carolina

A Process and Impact Evaluation

Prepared for
Duke Energy

139 East Fourth Street
Cincinnati, OH 45201

October 24, 2011

Submitted by

Carol Yin
Yinsight, Inc.

Pete Jacobs
BuildingMetrics, Inc.

Michael Ozog
Integral Analytics, Inc.

Nick Hall, Brian Evans
and John Wiedenhoeft
TecMarket Works
165 West Netherwood Road
2nd Floor, Suite A
(608) 835-8855

TABLE OF CONTENTS

About This Report

This report presents the results of a process and impact evaluation of the Non-Residential Energy Assessment Program (EAP) in North and South Carolina. The purpose of the evaluation is to provide feedback that can help the program provider consider changes to the program that can help achieve improvement in cost effective operations, help understand program impacts and obtain an understanding of customer related conditions and satisfaction.

Executive Summary

The program is offered as an energy resource program marketing and participant attraction tool. Its primary purpose is to provide customers energy efficiency recommendations that will convince them to enroll in Duke Energy's prescriptive or custom program offerings. The program is also a customer satisfaction support tool, designed to build the relationship between the customer and Duke Energy in a way that additional energy savings are acquired via the Duke Energy offerings as a result of a service that focuses on providing customers tailored information about efficiency opportunities for their facility.

The Carolinas' Energy Assessment Program is a well-designed program that is structured within the Duke Energy non-residential program portfolio. The performance of the program seems to be consistent with the objectives of the program in that participants are taking the recommended actions via participation in other programs and are satisfied with the program and its services. The program is not designed to focus on acquiring direct savings, thus its performance can only be measured in terms of how it affects the portfolio's ability to attract participants and acquire savings compared with the cost to operate the program as a marketing tool.

Key Findings and Recommendations

The key findings and recommendations identified through this evaluation are presented below.

Program Operations: Recommendations

1. RECOMMENDATION: The Non-Residential Energy Assessments Program (EAP) should work with the Account Managers to develop clear criteria for identifying prospective participants for the Smart $aver® program based upon segmentation of past Smart $aver® participants. An analysis of what projects and measures were of interest to past Smart $aver® participants in each industry sector would allow Account Managers to make suggestions of similar projects to prospective participants in the same sector. This would allow the budget for the EAP to be directed to those customers who are more likely to take action.
2. RECOMMENDATION: Track the conversion rate (i.e. percentage of EAP participants who adopt EAP recommendations through subsequent Smart $aver® projects) and identify those Account Managers who are more successful at actively converting EAP participants into Smart Saver® participants. These Account Managers may have developed successful strategies that could be shared with other Account Managers to help them increase Duke Energy's overall conversion rates from EAP to Smart $aver®.
3. RECOMMENDATION: The results from the survey of participants indicates that customers are looking for a more comprehensive, more investigative assessment that

focuses on new items that they are not already considering. The next evaluation of this program should include a more focused effort on understanding what participants expect to see from the service and the quality of the services expected. That assessment should also focus on understanding the customer's needs associated with short term versus long term recommendations and in terms of electric-only versus more comprehensive sustainability recommendations. While the primary objective is to help customers identify projects that can be implemented under the Smart $aver® program, the overall credibility of energy efficiency-related recommendations may be enhanced by including recommendations that present a more comprehensive approach to reducing operating costs. Depending upon the survey results, Duke Energy may also elect to design additional assessment offerings, such as a "zero net energy assessment" or other high savings assessments (not just those recommendations that are cost effective for Duke Energy) for those customers who are motivated to achieve deep energy savings. This would help maintain Duke Energy's standing as the customers' primary partner in meeting all their energy needs, including any need to explore sustainable energy options for their company.

4. RECOMMENDATION: Tailor the report to provide recommendations that are targeted to the specific needs of different commercial market segments. This will allow Duke Energy to show customers that their needs are understood, and that the assessment report's recommendations are customized especially for them. Duke Energy can begin to develop these targeted recommendations by first asking Account Managers to identify a few key market sectors that they believe have the greatest untapped potential for energy savings. Duke Energy can survey the Smart $aver® participants and non-participants within those sectors to determine their needs, wants, barriers to participation, and how well the Smart $aver® program addresses those. If Duke Energy has not already done so, we recommend that Duke Energy also conduct market characterization studies for those sectors to see what the mid- to long-term energy-use related trends are for that market, and also to aid in their conversations with the customers about the projects with longer paybacks. Information from the surveys and any market characterization studies can also be used to build case studies that will help other customers understand the process and benefits of participating in Smart $aver®.
5. RECOMMENDATION: The next evaluation should also look deeper into the value associated with providing recommendations for low-cost and no-cost savings in addition to the Energy Assessment recommendations for projects. Likewise, the evaluation should conduct some contingency analyses of a broader set of recommendations-adoption data to determine whether adopting low-cost and no-cost recommendations affect the adoption of Smart $aver®-eligible measures. In a parallel study, the assessment should investigate whether there are any corollary benefits to including low-cost and no-cost recommendations. For example, excluding low-cost and no-cost recommendations may inadvertently emphasize the greater expense of the Smart $aver®-eligible measures, and thus increase the perceived first-cost barriers to becoming more energy efficient.
6. RECOMMENDATION: EAP should use the program's follow up activities to obtain immediate feedback on the usefulness of the assessment reports. This may allow a better leveraging of resources. Additionally, if Account Managers are conducting the follow up

feedback, the program's Smart $aver® objectives and services can be kept at the forefront of customer interactions.

7. RECOMMENDATION: Develop the program website so that it is easy to find on the web, has a clear presentation of the services offered and the service approach, and an easy to use web-based enrollment process.
8. RECOMMENDATION: Design the assessment to formally provide low-cost and no-cost recommendations to customers and incorporate estimates of the impact of these actions, when implemented into the tally of energy saved credited to Duke Energy (and other utilities) as a result of the program. The low-cost and no-cost savings may not be eligible for cost recovery, but it is important to document the full value of the EAP, whether officially credited or not. This will allow Duke Energy to make decisions with a more comprehensive knowledge of how each energy efficiency program interacts with the other programs in Duke Energy's energy efficiency portfolio.

Implementation Rates: Key Findings

1. **Many Recommendations are Accepted and Used:** Fifteen facilities; including thirteen receiving offsite assessments, and two receiving onsite assessments, were provided with a total of 94 recommendations:
    - The overall implementation rate for all recommended measures was 16.8%.
    - 49.5% of the recommendations were rejected by the customer and will not be implemented.
    - 11.6% of recommended measures were installed prior to receiving the report
    - 12.6% of recommended measures are planned for the future

2. **Participants Take Action Rapidly:** Of the recommendations that were implemented prior to the independent evaluation survey, 64% were completed within six months of receiving the report. 50% were completed immediately upon receipt of the recommendation or within the following 30 days.

3. **Economy and Corporate Conditions Slow Measure Installations:** Corporate economic conditions and the firm's current financial status together represent the most common reasons provided for a recommended measure not being implemented. These two reasons are similar in that they deal with the firm's financial condition within the economies in which they operate. As a result, measures with long payback periods and/or excessive upfront capital costs become the measures cited most often as those that cannot be implemented.

Program Satisfaction: Key Findings

1. **Satisfaction scores show room for improvement:** Participants gave the three highest satisfaction scores to "Ease of Requesting Assessment," "Convenience of Scheduling Report" and "Clarity and Ease of Understanding Report" which received satisfaction

ratings of 8.5 or higher on a ten point scale. However, no category had an average score of more than 8.8, and two categories ("Length of Time to Receive Assessment" and "Practicality of the Recommendations Provided") were given ratings of seven or less more than 50% of the time.

2. **Assessment report delays and practicality of report are concerns:** Five participants noted that they encountered delays in receiving their assessment. The briefest delay mentioned was two weeks. Eight of fifteen participants rated the overall practicality of the report at less than eight, and one participant stated that he implemented zero recommendations directly as a result of the lack of practicality.

Engineering Impact Estimates: Key Findings

There were a total of 201 customers in the Carolinas that received an energy assessment. Fifteen of the 201 customers were interviewed for this evaluation. Of the 15 interviewed, 7 were able to verify the actions implemented as a result of the assessment report[1]. The energy saving measures taken by these seven customers as a result of the program provide gross annual savings of 8,663,381 kWh, -23,904 MMBtu, and reduction of peak load by 882 kW. A breakdown of the savings by customer can be seen in Table 1.

Table 1. Program Savings Estimate Breakdown by Customer (Excludes Smart $aver® Incentives)*

Customer	kWh	kW	MMBtu
Customer One	764,422	72.7	-2,140
Customer Two*	0	0.0	0
Customer Three	4,159	0.0	0
Customer Four	8,779	4.5	-25
Customer Five	64,696	0.0	0
Customer Six	11,777	0	0
Customer Seven	45,492	0.0	0
TOTAL	**899,324**	**77.1**	**-2,165**

*Customer Two completed a lighting retrofit, achieving gross annual savings of 7,764,057 kWh and reducing peak load by 805 kW. The retrofit was advised through the Energy Assessment program, but facilitated by the Prescriptive Smart $aver® program, through which this customer received a rebate for both the fixtures and the accompanying occupancy sensors. All savings achieved by this customer has been attributed to the Prescriptive Smart $aver® program and is therefore not counted toward the Energy Assessment's total savings represented in Table 1.

[1] Because the primary purpose of this study is the process evaluation, the sample of customers interviewed is too small for programmatic energy impacts to be estimated. However, the impact analysis provides a sample of the types of projects and the level of energy savings than can be expected from those customers who take the recommended actions.

Table 2 shows all of the measures that contribute to program savings and the number of customers that implemented them. The table also details gross savings as well as per unit savings broken down by measure.

Table 2. Summary of Program Savings by Measure

Measure	Participation Count	Ex Ante Per unit kWh impact	Ex Ante Per unit kW impact	Gross Ex Ante kWh Savings	Gross Ex Ante kW Savings
Lighting: Metal Halide to HO T8	2	1,634	0.156	764,910	73.13
Lighting: Metal Halide to T5 and Occupancy Sensors	1	2,810	0.291	7,764,057	804.7
Exhaust Hood Fan Controls	1	4,159	0.000	4,159	0.000
Lighting: Hg Vapor to T8	1	63.77	0.061	446.4	0.425
Lighting: T12 to T8	1	326.8	0.150	7,844	3.590
Compressed Air System Repair and Maintenance Program	1	64,696	0.000	64,696	0.000
Control System for Tenter Frame Exhaust	1	11,777	0.000	11,777	0.000
Compressed Air System Leak Check Program	1	45,492	0.000	45,492	0.000

Introduction

This report presents the findings from the evaluation of the Carolinas' Energy Assessment Program. The Energy Assessment Program provides informational and educational support and resources to non-residential customers to help identify energy savings opportunities. The program is marketed through phone and face-to-face contact with customers by Duke Energy representatives, the Duke-Energy.com web content, and Duke Energy's Business Services Newsline.

The evaluation was comprised of in-depth interviews with two program managers and surveys with fifteen out of the 201 customers who participated between February of 2009 and June of 2010; a 7.5% response rate. There were four objectives to this survey:

1. **Process Evaluation Findings** – The in-depth interviews provides a detailed investigation into program operations, goals, and suggestions for improvements and changes.

2. **Review of Implementation Rates** – Those surveyed were asked if their company has installed or implemented each of the recommendations provided in the Energy Assessment Report. In addition, 1 or 2 follow-up questions are asked for each recommendation taken to help understand actions taken and to estimate energy savings from those actions.

3. **Review of Program Satisfaction** – We asked the responders about their satisfaction with the program, assessment staff, and the Energy Assessment Report.

4. **Review of Non-Energy Benefits Associated with Measure Implementation** - We asked the responders about changes in maintenance costs, employee morale, and sales that they attribute to the recommended measures being installed.

The complete instruments can be found in the Appendices to this report.

Methodology

This study also implemented a participant survey with facility managers to obtain their opinions and recommendations about the program and to identify the types of actions that are being taken as a result of the assessment provided through the program. The survey also included satisfaction and program operations questions to help Duke Energy determine if the program is being implemented effectively from the perspective of the participants. This study focuses on participants from January 2009 to June of 2010. At the time of the evaluation, a total of 201 participants in North and South Carolina had received the assessment and had enough time to implement the recommended actions (at least 6 months). The evaluation focused the data collection efforts on interviewing these participants. A total of 15 participants were interviewed for this evaluation (9%).

The evaluation survey focused on the collection of implementation rates for the recommended measures and behaviors and their levels of satisfaction with the audit, communications, and the recommendations provided. (See Appendix B: Participant Survey Instrument.) The survey also assessed program process issues including the ease of signing up for the assessment, the

convenience of scheduling the inspection, the quality and completeness of the inspection, the recommendations provided, knowledge of the auditor, and the assessment report itself. The findings from this evaluation are presented in the following sections of this document.

Evaluation Findings
Process Evaluation

Introduction

The Energy Assessment Program (EAP) has two objectives. First, it is designed to assist Commercial and Industrial customers in identifying energy efficiency projects for their facilities that would qualify for Duke Energy's Non-Residential Smart $aver® Program. The EAP is marketed through Duke Energy's Account Managers. Duke Energy shares the cost of the facility assessment with the customer. At the time of these interviews, the facility assessment cost $3,000 for a one day assessment and $600 for each additional day. If the customer chooses to undertake a Smart $aver® project after receiving the assessment report, Duke Energy then reimburses the customers half of the assessment costs. Second, the EAP is provided as a customer service, to help build relationships between the customer and Duke Energy Account Managers.

Background

Duke Energy began offering assessments to their Carolinas customers as part of the settlement agreement when merging with Cinergy. The current program was launched when the Non-Residential Smart $aver® program was started, and in the fall of 2010 changed its management structure, moving from one program manager to two: one dedicated to the Midwest including Ohio and one dedicated to the Carolinas. Both program managers work closely together so that the program offering is identical in both regions, and the internal control procedures and administrative help is provided by the same people for both regions. Both program managers were interviewed as a part of this process evaluation.

Relationship Building

Although the EAP is explained on Duke Energy's website, it is hard to find using typical subject search engines and the presentation of services and enrollment processes is difficult to navigate. This restricts program information availability and enrollment into the program. However, the EAP is mostly marketed through Duke Energy's large customer Account Managers. The Account Managers discuss with the customer their plans and help review how customers are managing their energy usage. If customers need help, they are told about the Energy Assessment Program and offered an energy assessment of their facility.

The program manager reports that the Account Managers see the EAP more as a relationship-building tool rather than a lead generation program that may eventually bring Duke Energy revenue through the Smart $aver® program. Program managers and business relationship managers have found the EAP to be very successful at building relationships with customers. However, that relationship objective sometimes overshadows the objective of increasing Smart $aver® participation and capturing the available savings. The Duke Energy program manager reports that Account Managers sometimes will offer the EAP on-site assessments as a "freebie", without qualifying the customer to see whether they may be good candidates for the Smart $aver® program. The other program manager agrees, saying that it is not clear that the Account Managers are identifying proper customers or effectively marketing the program to a wider group of customers who may want this service.

Assessments

Duke Energy's non-residential customers can participate in the Energy Assessment Program in three ways: Customers can look for the assessment tool on Duke Energy's website at any time, and this online assessment is available to customers of all sizes. For larger customers (> 500kW), Duke Energy also offers an off-site phone-based assessment, and an on-site assessment. Duke Energy provides the online and off-site phone assessments at no cost to the customers. The the cost for a one day assessment is $3,000; each additional day costs $600. Duke Energy will pay half the cost of the on-site assessment if the customer has paid into the energy efficiency rider. All customers who want to participate in the on-site assessment must first participate in the off-site phone assessment.

During the off-site assessment, the customer is asked to provide information about their facilities. Duke Energy retrieves their facility's historical usage and rate comparison, and provides this information to an assessor. The assessors are contractors with different areas of expertise, and are assigned based upon the facility's characteristics. The assessor contacts the customer and provides an off-site report.

Assessors

There are three outside companies who conduct the assessments: Advanced Energy, Petra Engineering, and Thermotech. Both Duke Energy program managers agree that these firms are doing a good job for Duke Energy and for their customers. One program manager reports, "*Most of my interactions have been with Thermotech; I think they are doing an outstanding job. We had a meeting with a client and he was thrilled with the report.*"

Reports and Recommendations

The assessment reports are generated a couple of weeks after the assessments, but can take "a little" longer if the customer requests that the reports' findings and recommendations be delivered in person. Reports focus on energy efficiency measures, but one of the Duke Energy program managers suggests it should also include referrals to other Duke Energy programs such as PowerShare®, or include suggestions for on-site generation. The assessment reports do sometimes include water savings recommendations. The lack of a strong referral component within the program service and materials does not take advantage of the exposure to the customer that has already been captured by the program.

In 2010, the EAP provided offsite reports to 43 customers, 17 (39%) of which then went on to have an onsite assessment of their facilities. In North Carolina, 28 off site assessments were completed and 9 customers (32%) continued on to the onsite assessment. In South Carolina, 15 off-site assessments were completed and 8 customers continued to the on-site assessment (53%). This high level of service expansion indicates that the customer is both satisfied with the service and what to expand on that service, but also that there is substantial interest in this market for the expanded service.

Quality Control

The Energy Assessment Program does not generate revenue for Duke Energy so management of the program consists of managing expenses and managing the assessment contractors. Program managers also try to review the assessment reports to maintain quality control whenever they

can, but they rely upon a different independent contractor to review the report and offer a second opinion on the recommendations. The program manager reports that the independent reviewer has generally been in agreement with the assessor's recommendations; occasionally the reviewer will ask whether the assessor has considered a particular recommendation, and the assessor would then explain why they made their particular decision.

Past Evaluation Recommendations

An early feedback mini process evaluation of Ohio's EAP was conducted early in 2010. Due to the program management change and the fact that the feedback report identified areas of improvement so recently, we do not expect that the recommendations could have been fully implemented. Because the Ohio program was identical to the Carolinas EAP, we will address those recommendations here as well.

Tracking: the Early Feedback study found that Duke Energy was in the midst of improving their customer tracking system for the then-new Energy Assessment Program. At the time of the interviews for this process evaluation, Duke Energy is using Salesforce.com to provide their customer relationship management (CRM) software. This CRM system is only available to Duke Energy employees, and allows the program managers to track a comprehensive set of customer data including: customer name, facility name, account name, location of facility, account owner, Account Manager, type of assessment requested, the assigned assessor, the status of the assessment, the dates of key events such as the date of the assessment and date of the report, and the status of the Account Manager follow up. The Duke Energy program manager reported that there are currently plans to integrate the assessment report's recommendations into "*opportunity records"* for each customer, to better track recommendations.

Low-cost and no-cost recommendations and actions with two-year paybacks: The Early Feedback report recommended that the EAP's reports include low-cost and no-cost recommendations, and actions that have a payback period of less than two years. At the time of this interview, the program management reports that the assessment reports do include these recommendations whenever they exist. One program manager reports that one of the assessors sort their recommendations by payback, according to a "proprietary algorithm".

Another program manager reiterates the concern pointed out in the Early Feedback report that the low-cost and no-cost measures generally cannot be claimed by Duke Energy: "*There's a discontinuity of goals there between Duke Energy's investments to achieve impacts and the low-cost no-cost recommendations…if Duke Energy is helping customers uncover and realize [more energy savings], there should be a recovery mechanism for the low-cost no-cost measures."*

There are no plans at this point to develop recovery mechanisms for these measures. This needs to be addressed, while the regulatory authorities in the Duke Energy states typically do not like to allow credit for recommendations that have less than a one-year payback. The Commissions have not to our knowledge excluded low-cost or no-cost measures from being credited to Duke Energy when the payback is greater than one year and when it can be documented that Duke Energy caused those actions to occur. As a result, Duke Energy is not now receiving credit for the energy savings generated via the no-cost or low cost recommendations. These should be

incorporated into the program as a formal part of the program and savings estimates for these changes should be credited.

One program manager reports that they are finding that manufacturers have already implemented the low-cost and no-cost measures "*because they have been squeezed for so long"*, while they report that the commercial building customers have just started to think about these types of measures. Duke Energy has also identified hospitals as a sector that has yet to implement low-cost and no-cost measures. The program manager reports that while they had not been tracking the types of low-cost and no-cost recommendations, the current effort to review and document the assessment report recommendations should provide useful data on the number and types of low-cost and no-cost recommendations that have been made and adopted when they have been included into the report and when follow-up tracking efforts have been completed.

Other recommendations made in the Early Feedback report were still being considered by Duke Energy at the time of the interviews, including the recommendation for Duke Energy to provide a package incentive that motivates customers to push for deeper savings for completing a group of actions.

Program Challenges

One of the program managers said "*Ultimately we want customers to take advantage of the Smart $aver® incentives, once they realize what advantages there are. We're not yet successful in linking the two*." The other program manager concurs, "*We can have some improvement in the frequency with which we convert assessments to energy projects, and we have some momentum in that.*"

One program manager believes that a coordinated approach between the Account Managers, the vendors, and the EAP is key to getting more EAP participants converted to Smart $aver® participants. When asked, this program manager acknowledged that following up on the assessment reports is very important, but that Duke Energy was still gathering data on whether customers were being followed up consistently by the Account Managers.

To Be Improved

Demonstrating Program Value

Both program managers are interested in a better understanding of whether the customer perceives value in the existing program. One program manager reports that Account Managers have indicated that customers desire more details, but it is not clear what kind of details are desired. The program manager is currently exploring this, "*We're stepping in to it, working with a client to identify the specific need*."

Both program managers also agree that their objective is to be able to demonstrate that the program is profitable for Duke Energy as well as the customer.

The program managers believe that the EAP has significant value as a relationship-building service for large nonresidential customers. They report that while they do not yet have

quantitative metric of the EAP's effectiveness, the fact that customers keep requesting energy assessments in the absence of a significant marketing effort is an indicator of its value. "Customers will often request an on-site assessment, saying '*I understand the costs and am willing to pay*'".

Tracking Recommendation Adoptions

Duke Energy is currently analyzing program records to determine whether the EAP recommendations were adopted by the participants. It is easier to track adoption if customers participate in the Non-Residential Smart $aver® Custom program because there are fewer participants and applications must be preapproved by Duke Energy. In contrast, the Non-Residential Smart $aver® Prescriptive program participants are more numerous and do not need to obtain project preapproval from Duke Energy. In order to track adoption, Duke Energy is compiling all the 2010 EAP reports and determining whether there is a correlation between the EAP recommendations and the customers' installations, as measured by the Non-Residential Smart $aver® Prescriptive rebates that were given. This analysis is expected to be completed sometime in early 2011.

The program management recognizes that customer adoption of recommendations is one of the best metrics of whether the EAP provides a useful service or not, along with the value of the savings achieved.

Duke Energy is also conducting pilot tests of a "*white glove*" assessment program that offers a $30,000 in-depth assessment and provides additional services such as obtaining contractor quotes for the customer, providing calculations to prove that the financial case is sound, and providing technical support that they need to fill out their applications. Only a few qualified customers have been offered this pilot program but the program managers report that the preliminary response has been good. "*It's a test case but it's working very well*." This pilot program is still in the development stages.

Program Successes

The program managers agree that the program works smoothly and cite the program's smooth and successful operations as one of the program successes. One program manager reports, "*I have a lot of good interactions with our vendor, and the account reps are very involved…I think it's a coordinated effort to stay in front of the customer*."

Results From Participant Interviews

The following parts of this evaluation present the results of the interviews with 15 participants.

Implementation Rates

While the sample of interviewed participants across the different types of assessments is small, in general, TecMarket Works found no significant differences in implementation or satisfaction rates between those participants who received on-site evaluations and those who did not. TecMarket Works completed 15 interviews from the 201 facilities that participated in the Energy Assessment Program in the Carolinas. Thirteen of these facilities received offsite assessments, and two received onsite assessments. These 15 facilities were provided with a total of 94 program-generated recommendations. Figure 1 presents the status of the recommendations provided for these 15 facilities.

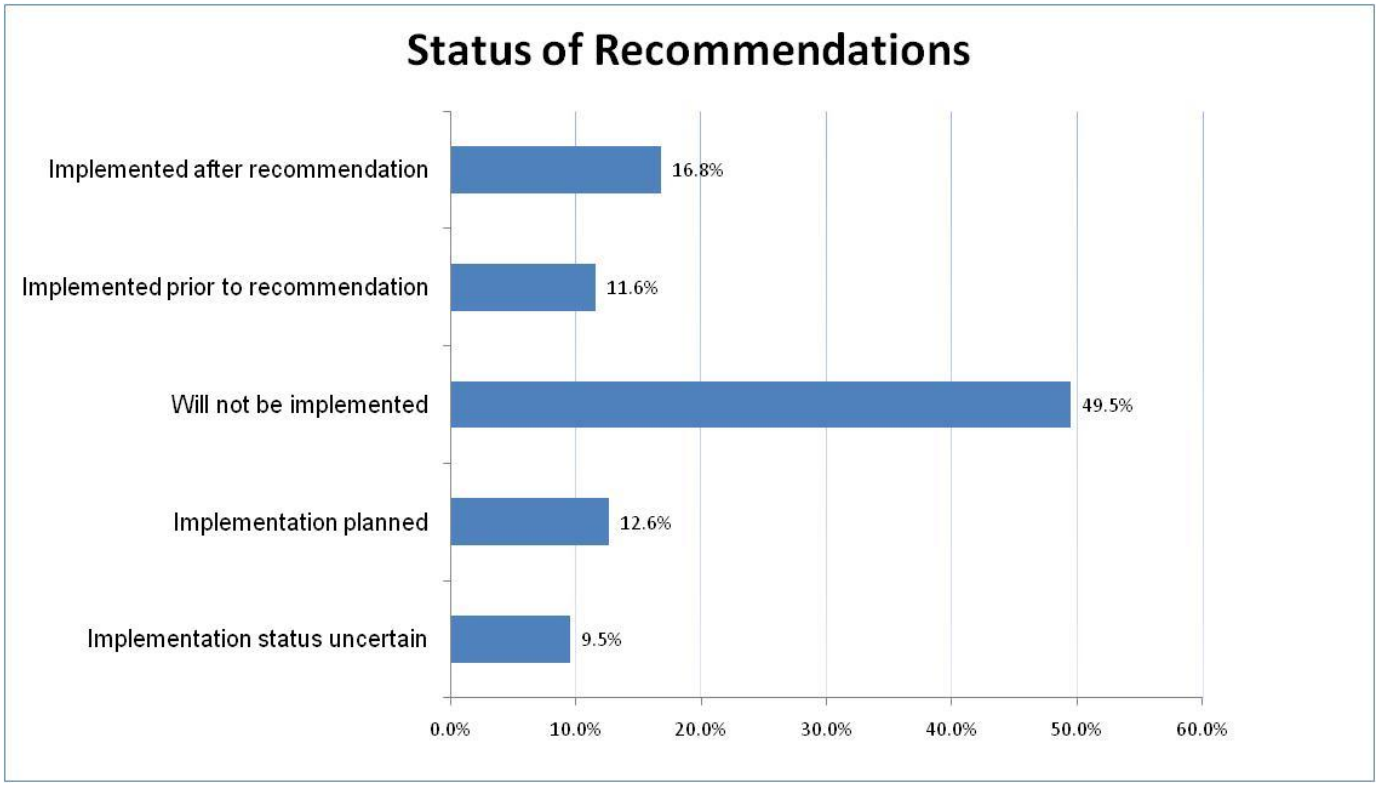

Figure 1. Status of Recommendations

The overall implementation rate for recommended measures is 16.8%, with 16 out of 94 recommendations implemented and another 12.6% of recommendations that participants say they will take in the future. Together this provides a recommendations implementation rate of about 30%.

Recommendations That Will Not Be Installed and Why

There were 43 recommendations (49.5%) that will not be implemented that were provided to the fifteen facility representatives interviewed. These recommendations are provided in the table below. In seven cases, the respondent declined to give a reason. The reasons for not installing

the measure or making the improvements were subjectively divided into three summary categories: *Technical, Economic, or Other*. Two (4%) of the reasons are categorized as Technical reasons for non-implementation, and 21 (49%) were classified as Economic reasons. 13 (30%) responses were classified as "Other" reasons for non-implementation..

Table 3. Reasons Recommendations Will Not Be Installed

Recommendation	Reason for Not Implementing, if Provided	Economic, Technical, or Other
VFD Addition to chiller	Not cost effective. ROI insufficient	Economic
Continuous monitoring and sustainable commissioning	Could not get budget approved	Economic
Compressed air shutoff and leak repair	Not cost effective. ROI insufficient.	Economic
Utilize thermal storage for HVAC	Not practical.	Economic
Implement an Air Leak Check program	ROI not sufficient.	Economic
Improve building envelope	Not cost effective due to building construction.	Economic
High efficiency motor replacement program	ROI not sufficient	Economic
Demand control	Not cost effective. ROI insufficient.	Economic
Metering and controls	ROI not sufficient. Controls similar to other stores.	Economic
Thermal storage	Not cost effective. ROI insufficient.	Economic
Food service testing	ROI not sufficient. Do in remodels and new stores only.	Economic
Replace Standard Metal Halide lamps with Pulse Start MH	Not cost effective.	Economic
Water filled cooler system	No capital to take action.	Economic
Replace High Pressure Sodium lamps with Pulse Start MH	ROI not sufficient.	Economic
Install Occupancy Sensors	ROI not there.	Economic

Water cooled chiller system	Not cost effective.	Economic
VFD on secondary chilled water and process cooing pumps	Not cost effective. ROI insufficient	Economic
Install plate heat exchanger for winter free cooling	Not cost effective. ROI insufficient.	Economic
Repair economizer dampers	Not cost effective. ROI insufficient.	Economic
Install pre-Heater to Tenter Frames	ROI not sufficient	Economic
Replace Lighting	Not cost effective	Economic
Reduce compressed air pressure	Not mechanically possible.	Technical
Insulate screw barrels on extruder machines	Not mechanically feasible	Technical
Variable pump speed controllers	Getting ready for major plant upgrade. Will use VFD in upgrade.	Other
Load Shifting	Morale.	Other
Revise temperature setback strategy	Their current strategy is correct.	Other
Potential process heating applications	Too risky.	Other
Utilize Energy Profiler Online (EPO)	Lack of time	Other
Put water heaters on a timer	Turned down temperature instead	Other
Replace chiller	Don't need capacity.	Other
Install and maintain economizers on HVAC	Are removing economizers.	Other
Occupancy sensors	Instead doing employee training and supervisor maintenance.	Other
Replace T12 with T8 lighting	Not applicable.	Other
Install VFD compressor	Don't need it.	Other

Steam trap check program	Have not had the time. Don't know where all the steam traps are.	Other
Monitor electric bills (late fees)	Not provided.	N/A
Siemens DOC control system upgrades and optimization	Not provided.	N/A
Reduce boiler pressure	Not provided.	N/A
install programmable thermostats	Not provided.	N/A
Replace domestic hot water heaters with instantaneous type heaters	Not provided.	N/A
Install VFDs on air handlers with inlet guide vanes	Not provided.	N/A
T12 to T8 lighting retrofit	Not provided.	N/A
Install a smaller boiler for summer	Not provided.	N/A

We asked if there was anything the program or Duke Energy could do to help the participants decide to take the program-provided recommendations. One respondent indicated that Duke Energy incentives would be helpful for two of the recommendations (installing VFDs and replacing lighting). All other responses were variations of "no" indicating that the participants could not provide indications for what the program could do to overcome resistance to implementing the recommended energy efficient action.

Recommendations That Are Under Consideration and Why

There were 11 recommendations categorized as "installation uncertain" by the respondents, indicating that they were not sure if they would take the action. These recommendations are provided in the table below. The reasons provided were likewise subjectively divided into three summary categories: *Technical, Economic,* or *Other*.

Table 4. Recommendations Under Consideration

Recommendation	Reason for Not Implementing, if Provided	Economic, Technical, or Other
Lighting replacements	Not cost effective at that time. Had just re-lamped plant.	Economic

Utilize Energy Profiler Online (EPO)	Low payback & not enough time	Economic
Lighting	Initial cost too high	Economic
Lighting - metal halide to T5 & T12 to T8 replacements	ROI not sufficient.	Economic
T8 to T5 conversion	Small area of building, long payback	Economic
Compressed air -install storage tanks	Not enough time or money	Economic
Utilize Energy Profiler Online (EPO)	Have not had the time	Other
Utilize Energy Profiler Online (EPO)	Have not had time to look into it	Other
implement Energy awareness strategies	Have not had the time	Other
Centralized Energy Management and Security controls	Are looking at several options.	Other
Integrate control system in in-room HVAC units	Getting numbers, researching	Other
Consider pre-cooling (temp floating)	Not provided	N/A

Again, we asked if there was anything the program or Duke Energy could do to help the participant decide to take appropriate recommendations. Two of the respondents indicated that better rebates for lighting retrofits would help them decide to take the recommended actions. The rest of the respondents could not think of what the program could do to cause them to implement the recommendations. Essentially, those customers consider the matter in their hands once the recommendation has been received.

Figure 2 summarizes the reasons for not implementing the recommendation or for the uncertainty over implementing the recommendation. The reasons are based in corporate economic conditions in almost half of the cases, and were least likely to be linked to technical barriers. Half of the reasons for not implementing a measure fall into the "Other" category. These primarily include lack of time to take the action or lack of a perceived need to make the change, even if there are savings.

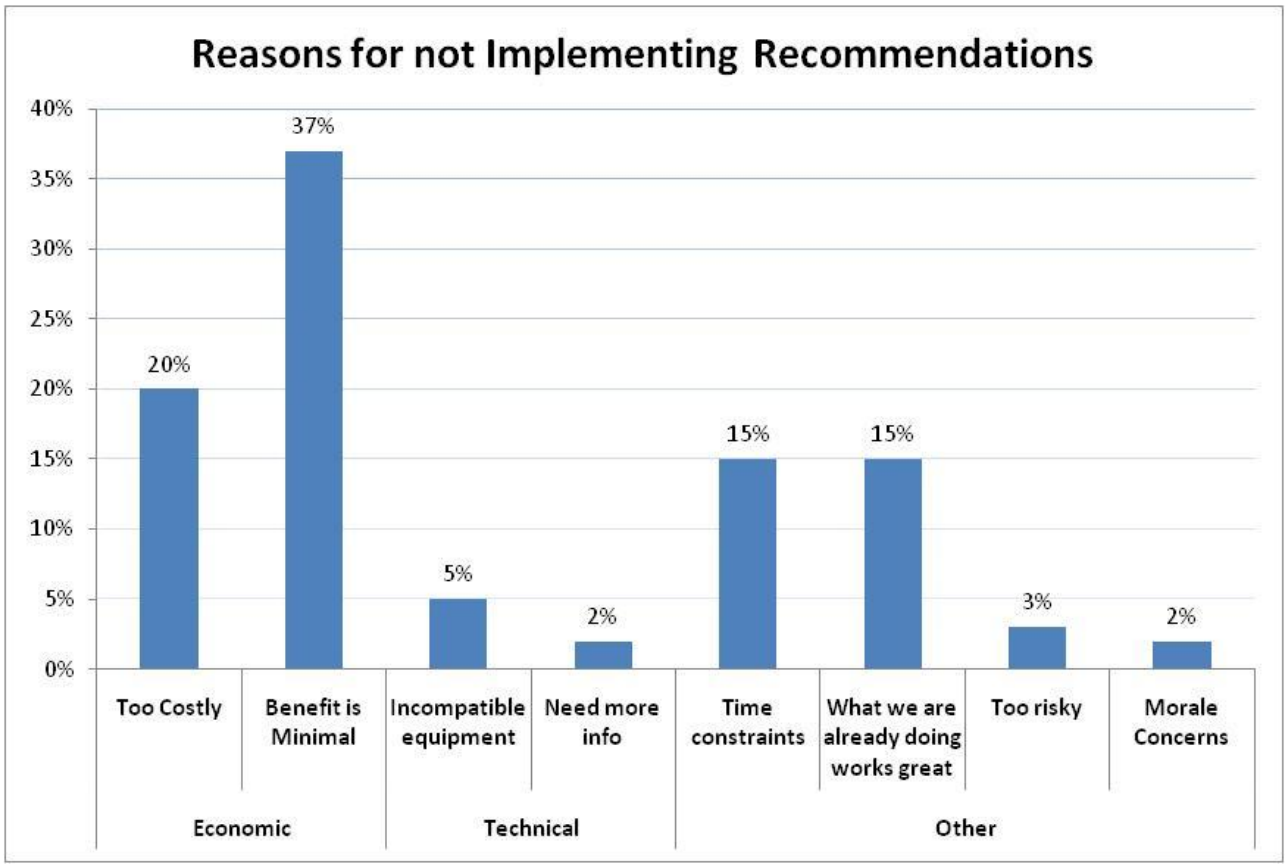

Figure 2. Reasons for Not Implementing Recommendations: Recommendations that will not be done and recommendations that are under consideration.

Timing of Actions

For each recommended action taken, we asked the responder how many months had passed between the time they received the report and the time when the action was taken. Respondents were able to answer this question for 14 of the 16 recommendations. The question was open-ended, allowing the respondent to provide an answer specific to their conditions. These respondents provided answers that grouped into five distinct periods of time: one month or less, three months, six months, 12 months and 18 months. The percentage of each response is provided below in Figure 3.

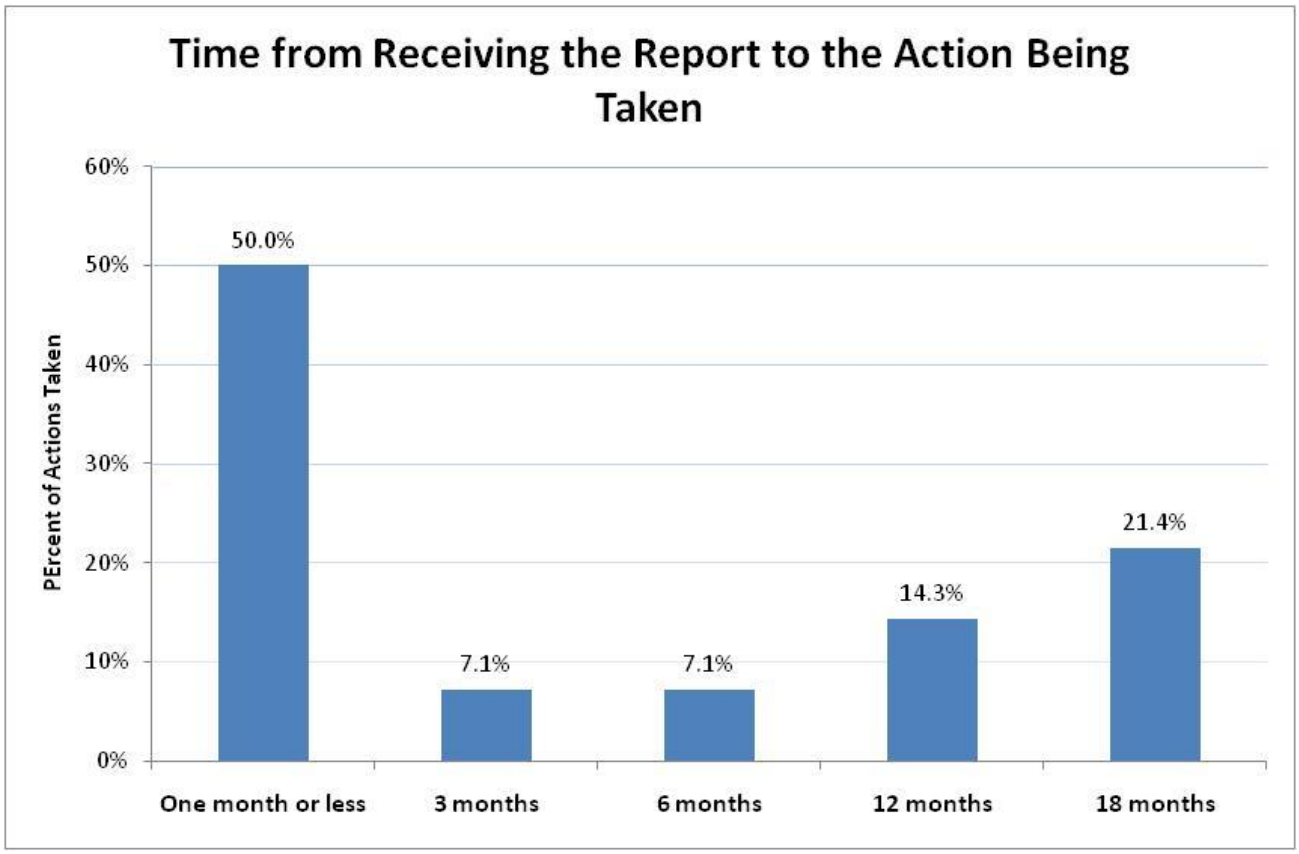

Figure 3. Months from Receiving the Report to the Action Being Taken

Figure 3 shows that 50% of the installed recommendations are installed almost immediately and that 64% are installed within six months of the facilities receiving the report. However, 36% of these participants required a year or more to implement the recommendations with 21.4% requiring 18 months.

Table 5 below shows each recommendation taken and the number of months between the participant receiving the report recommendations and implementation of those actions.

Table 5. Individual Recommendations Implemented

	Measure	Months
1	Lighting upgrades	1
2	Compressed air system repair and maintenance program	1
3	Implement an Air Leak Check program	1
4	Install Control System for Tenter Frame Exhaust	1
5	Lighting retrofit - 32w to 28w T8 retrofit	1
6	Implement Office equipment efficiency measures	1
7	Install cooling tower make-up water deduct meter	1
8	Metal halide to T5 conversion	3
9	Lighting upgrades	6
10	Incandescent to CFLs conversion	12
11	Retrofit walk-in coolers and freezers with new cooling system	12

12	Energy star vending machines	18
13	HVLS fans to replace personal cooling fans	18
14	Install exhaust hood fan controls	18

Program Satisfaction

Respondents were asked to rate various aspects of the program on a scale of one to ten, with one meaning they were very dissatisfied and ten meaning they were very satisfied. If a respondent provided a satisfaction score of seven or lower, they were asked how that aspect of the program could be improved.

The average satisfaction response across the eight respondents is presented in Table 6. The ability to answer each satisfaction question varied from participant to participant, therefore the sample size for each question varied from n=14 to n=15.

Table 6. Participant Satisfaction

Criteria	Satisfaction Rating	Range	N	Percent of ratings greater than 7
Responsiveness of Duke Energy staff	8.3	2-10	14	86%
Length of time to receive assessment report	6.9	1-10	14	43%
Report meets expectations	7.9	3-10	14	64%
Knowledge of energy specialists	8.1	2-10	15	80%
Ease of requesting assessment	8.5	3-10	14	86%
Review and discussion of the recommendations	8.1	1-10	15	67%
Comprehensiveness and completeness of assessment report	7.4	2-10	15	53%
Quality of inspection	7.3	1-10	15	60%
Completeness of inspection	7.5	5-10	15	53%
Clarity and ease of understanding assessment report	8.6	6-10	15	87%
Convenience of scheduling inspection	8.8	8-10	15	100%
Practicality of the recommendations provided	7.1	1-10	15	47%

Overall satisfaction with the assessment and report was high with scores higher than eight on half of the aspects of the program. The program's lowest marks come from the "Length of time to receive assessment report" and "Practicality of recommendations provided" categories. Delays were cited as the reason for lower ratings in the "Length of time" category and the reasons for lower ratings in other categories mostly involved a desire for a more comprehensive inspection and assessment.

While overall the ratings are high, the following are all the reasons given for ratings of 7 or lower in each category:

Responsiveness of Duke Energy Staff:

- "At our previous utility we had a "business partner", a liaison from the utility. There is no give-back, no customer service from Duke."

Length of Time to Receive Report

- "Expected 2 weeks, took 6 weeks"
- "Took too long"
- "Took years"
- "Delays"
- "Due date not met. 2-week delay requested"

Report Meets Expectations

- "Need more in-depth inspection of mechanical aspects, not just electric. Inspectors seemed to have pre-conceived concepts, an agenda."
- "Overlooked a lot of things."
- "More specific recommendations needed."
- "Many items already known."
- "Had higher expectations."

Ease of requesting assessment

- "It was difficult to reach Duke staff."
- "Lots of preliminary info needed. Scheduling issues."

Review and discussion of the recommendations

- "Not much new."
- "Need more specific recommendations."

Comprehensiveness and completeness of assessment report

- Need more in-depth inspection of mechanical aspects, not just electric. Inspectors seemed to have pre-conceived concepts, an agenda."
- "Overlooked a lot of things."
- "More specific recommendations needed."
- "Many items already known."
- "Need more information on costs for recommendations."
- "Report should have been more thorough"

Quality of inspection

- "Seven of our hospitals were assessed. The first was very thorough. Subsequent ones used "cookie cutter" approach, and less time and staff."

Practicality of the recommendations provided

- "Will not do any of the recommendations."
- "The report overlooked a lot of things."
- "More specific recommendations are needed."
- "Many of the recommendations are too expensive."

- "The assessment needs to be more in depth. We already knew a lot of the recommendations"
- "Assessor seemed to have pre-determined ideas."

For the "Knowledge of energy specialist" and "Convenience of scheduling inspection" categories, no reasons were given for ratings of 7 or lower.

Non-Energy Benefits

Participants who indicated that they had installed a recommended measure were then asked follow-up questions to determine if any non-energy benefits had resulted from the implementation. The categories and percentages are shown in Table 7 below. Twelve of the 15 total surveyed participants (80%) gave answers for at least four of the categories, and eleven surveyed participants gave answers to all categories of the Non-Energy Benefits questions. Respondents were also asked to estimate a dollar amount in savings resulting from the non-energy benefit. Those results are also included where applicable.

Almost half (45%) of respondents for this question indicated that equipment life was positively affected by the recommended measure. Moreover every category had at least two respondents that indicated a positive change. No respondents indicated that the recommended measure affected these non-energy criteria negatively.

Table 7. Non-Energy Benefits from Implementation

Benefit Category	Change Noticed?			Average Estimated Benefit
	Yes (all reported as beneficial)	No	Don't Know	
Equipment Life (N=11)	45%	27%	27%	$75,500 (n=2)
Maintenance (N=12)	33%	33%	33%	$17,300 (n=3)
Productivity (N=11)	27%	45%	27%	
Errors (N=12)	25%	50%	25%	$10,000 (n=1)
Morale (N=12)	17%	58%	25%	
Waste Generation (N=12)	17%	58%	25%	

Perception of Realized Savings

Participants who indicated that they had installed a recommended measure were then asked follow-up questions regarding whether they felt they were achieving the savings estimated in the report. Participants were then asked to provide an estimate of the cost of implementation and whether that cost was more or less than they had expected.

Eight of fifteen surveyed respondents (53%) answered the question for 12 of 16 (75%) the installed measures. For six of the measures, survey participants responded with a "yes" they had achieved the estimated savings. Two respondents stated that they were "Not sure" about the savings of four of the measures installed, and one respondent stated that it was "too early to tell" if savings had been achieved on the implementation.

Participants were also asked if the cost to implement the recommended measures was more, less, or in line with their expectations. Four (50%) of the eight surveyed respondents who answered this question indicated that the cost for seven measures was in line with their expectations.

Three (38%) respondents also indicated that four (25%) of the installed measures cost less than expected, and one (12%) respondent indicated that installation costs were more than expected.

The measures with cost and saving expectations are listed in Table 8 below. The high level of "met expectations" responses suggests that participants are receiving accurate information from the assessment regarding implementation costs and savings estimates in several categories (lighting, building envelope, compressed air system maintenance).

Table 8. Measure Costs and Savings Compared to Expectations

Measure	Cost	Achieved Estimated Savings?
Lighting Upgrades	As expected	"Not sure."
Compressed air system repair and maintenance program	As expected	"Not sure."
Implement an Air Leak Check program	As expected	Yes
Metal halide to T5 conversion	Less than expected	Yes
Repair and install economizers	As expected	No
Install Control System for Tenter Frame Exhaust	As expected	Yes
Lighting retrofit - 32w to 28w T8 retrofit	Less than expected	"Not sure."
Lighting Conversion	More than expected	"Too early to tell."
High-bay lighting changes	As expected	"Not sure."
HVLS fans to replace personal cooling fans	As expected	Yes
Retrofit walk-in coolers and freezers with new cooling system	Less than expected	Yes
Implement Office equipment efficiency measures	Unsure	Yes

Additional Comments About the Program

The concluding questions had participants identify attributes of the program that they did and did not like. The most frequently mentioned positive was the information and recommendations that the program provided. The most frequently mentioned negative aspects were a lack of specific recommendations or "new" ideas. Lastly, participants were asked if they could change one thing about the program, to identify what change they would make. The responses can be seen in the lists below.

What Participants Liked Most About the Program

- "Confirmed what we already knew and were doing." (N=3)
- "It saved our company money and brought awareness of energy saving opportunities."
- "It opened my eyes to the way people think about conserving resources/energy and heightened awareness of available incentives."
- "It was specific to our store."
- "The cost was good."
- "It is structured well."
- "Advanced Energy was very good."
- "It was free."
- "Learning about cost savings."
- "It was very thorough."
- "Gave me a better understanding of energy usage."

What Participants Liked Least About the Program

- "Initial cost of recommendations was too high."
- "Payback on recommendations was too long."
- "No usable recommendations."
- "The report was disappointing. I found a lot more recommendations on my own."
- "There was a lack of specific recommendations."
- "There was a lack of thoroughness."
- "It needs more and better recommendations."
- "The level of detail is too low."
- "It was a waste of time."

What Participants Would Like To See Changed

- "Understand upfront what energy saving measures are already ongoing, and then focus on new ideas."
- "Get Duke Energy involved more with less dependence on sub-contractors."
- "Have more thorough assessments."
- "Reduce delays."
- "Increase the scope of the assessment."
- "Spend more time at the facility."
- "Provide greater detail."
- "Provide more time for the assessment."
- "Provided better estimate of costs and benefits."

Effect of Current Economy on Energy Efficient Actions

Survey participants were asked if their company was more or less likely to investigate and implement energy saving measures given the current state of the economy. Eight of the respondents indicated that their company would spend more investigating energy efficient measures. Three respondents indicated his or her company would spend the same amount and

one respondent was unsure of company spending. No respondents indicated that their company would spend less.

Participant Program Referrals

Finally, participants were asked if they had referred the Non-Residential Energy Assessment program to other companies. One respondent indicated that they had recommended the program to three other internal company divisions. Fifteen respondents indicated that they had not recommended the program to anyone. One of those respondents said that he would recommend the program if it showed some improvement.

Engineering-Based Impact Analysis

There were a total of 201 customers in the Carolinas that received an energy assessment. Fifteen of the 201 customers were interviewed for this evaluation. Of the 15 interviewed, 7 were able to verify the actions implemented as a result of the assessment report. For these seven participants we were able to estimate the expected energy savings from the actions they had taken, based on a set of follow-up questions about their projects. The energy saving measures taken by these seven customers as a result of the program provide gross annual savings of 8,663,381 kWh, -23,904 MMBtu, and reduction of peak load by 882 kW. A breakdown of the savings by customer can be seen in Table 9.

Table 9: Program Savings Estimate Breakdown by Customer

Customer	kWh	kW	MMBtu
Customer One	764,422	72.7	-2,140
Customer Two*	0	0.0	0
Customer Three	4,159	0.0	0
Customer Four	8,779	4.5	-25
Customer Five	64,696	0.0	0
Customer Six	11,777	0	0
Customer Seven	45,492	0.0	0
TOTAL	**899,324**	**77.1**	**-2,165**

*Customer Two completed a lighting retrofit, achieving gross annual savings of 7,764,057 kWh and reducing peak load by 805 kW. The retrofit was advised through the Energy Assessment program, but facilitated by the Prescriptive Smart $aver® program, through which this customer received a rebate for both the fixtures and the accompanying occupancy sensors. All savings achieved by this customer has been attributed to the Prescriptive Smart $aver® program.

All savings calculations were made using equations from the Ohio TRM[2], which are presented alongside each customer's energy savings in the individual customer sections. Savings adjustment factors used include:

WHFe = 0.095

WHFe is the lighting-HVAC interaction factor for energy. This factor represents the reduced electric space cooling requirements due to the reduction of waste heat rejected by the efficient lighting.

WHFd = 0.2

WHFd is the lighting-HVAC waste heat factor for demand. This factor represents the reduced electric space cooling requirements due to the reduction of waste heat rejected by the efficient lighting.

IFMMBtu = -.0028

IFMMBtu is the lighting-HVAC interaction factor for gas heating impacts. This factor represents the increased gas space heating requirements due to the reduction of waste heat rejected by the efficient lighting.

CF = Varies

[2] The Ohio TRM is available online at OhioTRM.org

CF is the summer peak coincidence factor and is dependent on building type.

ESF = Varies

ESF is the energy savings factor. This factor represents the additional savings percentage achieved and is dependent on the measure and installation types.

Customer One

This project involved a lighting retrofit in an industrial building with annual operating hours of 8,760. For the retrofit, 458 400-Watt metal halide lamps were replaced with 226-Watt T8s. This measure provides gross annual savings of 764,422 kWh and reduces the peak load by 72.7 kW.

Lighting:

ΔkWh = (WATTSbase – WATTSee) * HOURS * (1 + WHFe) / 1000
ΔkW = (WATTSbase – WATTSee) * CF * (1 + WHFd) / 1000
ΔMMBtu = ΔkWh * IFMMBtu

Customer Two

This project involved a very large lighting retrofit including occupancy sensors installed in an industrial building with annual operating hours of 6,708. For the retrofit, 3,803 400-Watt metal halide lamps were replaced with 2,763 240-Watt T5s. These measures provide gross annual savings of 7,764,057 kWh and reduce peak load by 805kW. As previously stated, all savings achieved by this customer have been attributed to the Prescriptive Smart $aver® program, through which this customer received a rebate for the fixtures and sensors.

Lighting with occupancy sensors:

ΔkWh = [WATTSbase – WATTSee * (1-ESF)] * HOURS * (1 + WHFe) / 1000
ΔkW = [WATTSbase – WATTSee * (1-ESF)] * CF * (1 + WHFd) / 1000
ΔMMBtu = ΔkWh * IFMMBtu

Customer Three

This project involved exhaust hood fan controls installed in a food sales building with annual operating hours of 4,264. The exhaust hood is assumed to be of average size, 56 SF, and to produce 76 cfm/SF with a motor efficiency of 0.78. This measure provides gross annual savings of 4,159 kWh.

Exhaust fan control system:

ΔkWh = Hood SF x cfm/SF x hp/cfm x .748 kW/hp / Motor eff x HOURS x ESF

Customer Four

This project involved three separate lighting retrofits, the first two in a wastewater treatment plant, and the third in an office building. The buildings have annual operating hours of 910 and 1,820 respectively. For the first lighting retrofit, 11 250-Watt metal halide lamps were replaced with ten 226-Watt T5s. For the second, seven 290-Watt mercury vapor lamps were replaced with 226-Watt T8s. For the third, 24 390-Watt T12s were replaced with 226-Watt T8s. These

measures provide gross annual savings of 8,779 kWh and reduce peak load by 4.5 kW. A breakdown of the savings by measure can be seen in Table 10.

Table 10: Customer Four Savings Estimate Breakdown by Measure

Customer Four	kWh	kW	MMBtu
Lighting retrofit (MH to T8)	488	0.4	-1
Lighting retrofit (Hg to T8)	446	0.4	-1
Lighting retrofit (T12 to T8)	7,844	3.6	-22
TOTAL	**8,779**	**4.5**	**-25**

Lighting:

ΔkWh = (WATTSbase – WATTSee) * HOURS * (1 + WHFe) / 1000
ΔkW = (WATTSbase – WATTSee) * CF * (1 + WHFd) / 1000
ΔMMBtu = ΔkWh * IFMMBtu

Customer Five

This project involved a compressed air system repair and maintenance program. This was implemented in an industrial building with annual operating hours of 7,488. The plant has three 110hp single stage screw type compressors, two of which are normally online. This measure provides gross annual savings of 64,696 kWh.

Compressed air system repair and maintenance program:

*ΔkWh = cfm * kW/cfm * ESF * HOURS*

Customer Six

This project involved the installation of a control system for a tenter frame exhaust. This installation was made in a light industrial building with annual operating hours of 4,992. This measures provides gross annual savings of 11,777 kWh.

Exhaust fan control system:

ΔkWh = hp x .748 kW/hp / Motor eff x HOURS x ESF

Customer Seven

This project involved the implementation of a compressed air leak check program in a light industrial building with annual operating hours of 4,290. The plant has three 100hp multi-stage screw type compressors, and one 100hp reciprocating compressor. This measure provides gross annual savings of 45,492 kWh.

Compressed air leak check program:

*ΔkWh = hp *.748 kW/hp / Motor eff * HOURS * ESF * Load Factor*

Appendix A: Management Interview Instrument

Name: _____

Title: _____

Position description and general responsibilities:

_____

_____

_____

We are conducting this interview to obtain your opinions about and experiences with the Facility Assessment Program. We'll talk about the Program and its objectives, your thoughts on improving the program and its participation rates, and the technologies the program covers. The interview will take about an hour to complete. May we begin?

Program Objectives

1. In your own words, please describe the Facility Assessment Program's objectives.

2. In your opinion, which objectives do you think are being met or will be met? How do you think the program's objectives have changed over time?

3. Are there any program objectives that are not being addressed or that you think should have more attention focused on them? If yes, which ones? How should these objectives be addressed? What should be changed? Do you think these changes will increase program participation?

4. Should the program objectives be changed in any way because of market conditions, other external or internal program influences, or any other conditions that have developed since the program objectives were devised? What changes would you put into place, and how would it affect the objectives?

5. Please describe your role and scope of responsibility in detail. What is it that you are responsible for as it relates to this program? When did you take on this role? *If a recent change in management…*Do you feel that Duke Energy gave you enough time to adequately prepare to manage this program? Did you get all the support that you needed to manage this program?
6. Do you think the incentives application process offered through the Facility Assessment program is easy to understand and complete?

7. Which recommendations have been implemented? Why, and why have other measures not been adopted?

8. What kinds of marketing, outreach and customer contact approaches do you use to make your customers aware of the program and its options? Are there any changes to the program marketing that you think would increase participation?

9. How do you inform trade allies and contractors about the program? How effective has this been in getting participation from the contractors?

10. Are there any changes to the marketing that could possibly increase participation in the program?

Overall Facility Assessment Management

11. Describe the use of any advisors, technical groups or organizations that have in the past or are currently helping you think through the program's approach or methods. How often do you use these resources? What do you use them for?

12. Overall, what about the Facility Assessment Program works well and why?

13. What doesn't work well and why? Do you think this discourages participation?

14. Can you identify any market or operational barriers that impede a more efficient program operation?

15. If you could change any part of the program what would you change and why?

Program Design & Implementation

16. What market information, research or market assessments are you using to determine the best target markets or market segments to focus on?

17. What market information, research or market assessments are you using to identify market barriers, and develop more effective delivery mechanisms?

18. How do you manage and monitor or evaluate contractor involvement or performance? What is the quality control and tracking process? What do you do if contractor performance is exemplary or below expectations?

23. In your opinion, did the incentives cover enough different kinds of energy efficient products and recommendations?

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If no, 22b. What should be included?

_____

_____

24. In what ways can the Facility Assessment Program's operations be improved?

25. Do you have any suggestions for how program participation can be increased?

Appendix B: Participant Survey Instrument

Hello, my name is <*name*> with TecMarket Works and I am calling in regard to the assessment that was provided to your facility through Duke Energy in <*Month Year*>. From that assessment, you were provided with a report that listed energy saving opportunities for your facility to pursue. The purpose of this call is to find out if you or your company have implemented any of the energy savings opportunities that were recommended in the report and to ask you a few questions about your satisfaction with the program's services. This call will only take about 5 or 10 minutes. Is now a good time?

In that report there were <#> **energy and cost saving opportunities recommended. There were: <*list*>.**

For each (some, if over 4 recommendations) **of these recommendations we would like to know…**

1. **If you have already taken the action,**
2. **If you have decided to take the action, but have not yet done so,**
3. **If you have decided not to take the action,**
   Or,
4. **If you are not sure if you are going to take the action**
5. **Already doing the action before the assessment was done.**

1. **Let's start with <*action1*>. For <*action1*> please tell me…**

   1. **If you have already taken the action,**
   2. **If you have decided to take the action, but have not yet done so,**
   3. **If you have decided not to take the action,**
      Or,
   4. **If you are not sure if you are going to take the action.**
   5. **Already taking the action prior to the assessment.**
   6. **Don't remember that recommendation**

Follow-up questions to Q1

If Q1 = a above…

2. **If you recall, about how many months after the assessment did you take this action?**
3. **Do you feel you are achieving the savings estimated in the report?**
4. **What were the costs associated with implementation?**
   a. **Was this more or less than what you had expected?**

If Q1 = b above…

5. **What are the reasons why your business has not yet taken this action?**

If Q1 = c above…

6. **What are the main reasons that you have decided not to take this action?**

If Q1 = d above…

7. **What are some of the reasons why you are not sure if you are going to take this action?**

If Q1 = b,c, or d above.

8. **Is there anything that you think the program can do to help you decide to implement this action or to make taking this action an easier or faster process?**

Read each of the energy saving recommendations and ask the above questions for each of the top 4 recommendations.

If time is an issue for participant, or if there are a more recommendations, ask the questions above for the top four energy savings recommendations, then ask about the remaining actions as a group…. For example:

9. **I am now going to read the rest of the recommendations contained in the report. Please tell me which of these actions you have already taken, and which of these you plan to take within the next year or two.**

Read remaining recommendations and ask which they have taken and which they are currently planning on taking within the next year or two.

Recommendation 5 _Have taken _Plan to take in the next year or two
Recommendation 6 _Have taken _Plan to take in the next year or two
.
.
Recommendation 14 _Have taken _Plan to take in the next year or two
Recommendation 15 _Have taken _Plan to take in the next year or two

I would now like to ask you about your level of satisfaction with the assessment service and the interaction with the assessment staff. I will read a series of statements. Please rate your satisfaction with each item on a scale from 1 to 10 with 1 meaning that you were not satisfied at all and 10 meaning that you were extremely satisfied.

10. How satisfied are you with...

	Score
a. The ease of signing up for the assessment?	
b. The convenience of scheduling the inspection?	
c. The completeness of the inspection.	
d. The quality of the inspection.	
e. The review and discussion of the recommendations	
f. The knowledge of the energy specialists who conducted the inspection and explained your assessment report.	
g. The length of time it took to receive the assessment report	

h. The clarity and ease of understanding the assessment report	
i. The comprehensiveness and completeness of the assessment report	
j. The practicality/usefulness of the recommendations provided	
k. The report meeting your expectations	
l. The responsiveness of Duke Energy staff	

If customer scores a 7 or less for any of these, ask

11. What would you like to see changed about …?

Ask this as you go, so that if we get a 7 or lower score, we ask about changes to that item at the same time, then go on to the next item.

This portion of the survey will focus on a range of benefits beyond the value of energy savings that may be associated with the energy efficiency improvements made in your facility. For example, some participants tell us that they were able to increase their sales levels as a result of the installation of new energy saving equipment. Others have told us that productivity or maintenance costs have been influenced as a result of the installation and use of new higher-efficiency equipment. These are the types of items that we are interested in learning about. I would also like to ask you about ways in which we might understand the value of these changes.

12. Thinking about all the measures *(and recommendations)* we've discussed so far today, have any of them resulted in an increase or a decrease in your company's <u>maintenance costs</u>?

a. Yes
b. No *(Skip to 13)*
c. DK/NS *(Skip to 13)*

12a. **Have you experienced an increase or decrease in <u>maintenance costs</u>?**

a. Increase
b. Decrease
c. DK/NS *(Skip to 13)*

12b. **How did the implementation of these measures <increase/decrease> <u>maintenance costs</u> at your company?**

(Probe for details, get the story, and record open-ended response)

_____
_____
_____
_____
_____

12c. **We would now like to obtain some idea of what the financial value of this change means to your firm. We realize that you will not be able to provide precise responses to these questions, but we are interested in your best estimate for these questions.**

What is your best estimate of the annual dollar value of this <increase/decrease> in maintenance costs?

a) Record annual dollar value: $_____
b) DK/NS →

12d. **We realized that giving a value to this question is difficult. If you were to estimate a range of values that you think might reflect the value of this benefit, what would be the low end and the high end of that estimated range?**

a. Low end of estimate $ _____ High end of estimate $ _____
b. DK/NS

13. Has there been an increase or a decrease in your company's employee morale?

a. Yes
b. No *(Skip to 14)*
c. DK/NS *(Skip to 14)*

13a. **Have you experienced an increase or decrease in employee morale?**

a. Increase
b. Decrease
c. DK/NS *(Skip to 14)*

13b. **How did the implementation of these measures <increase/decrease> employee morale at your company?**

(Probe for details, get the story, and record open-ended response)

_____
_____
_____
_____
_____

13c. **We would now like to obtain some idea of what the financial value of this change means to your firm. We realize that you will not be able to provide precise responses to these questions, but we are interested in your best estimate for these questions.**

What is your best estimate of the annual dollar value of this <increase/decrease> in employee morale?

a) Record annual dollar value: $_____

b) DK/NS →

13d. **We realized that giving a value to this question is difficult. If you were to estimate a range of values that you think might reflect the value of this benefit, what would be the low end and the high end of that estimated range?**

a. Low end of estimate $ _____ High end of estimate $ _____
b. DK/NS

14. Has there been an increase or a decrease in your company's <u>equipment life</u>?

a. Yes
b. No *(Skip to 15)*
c. DK/NS *(Skip to 15)*

14a. **Have you experienced an increase or decrease in <u>equipment life</u>?**

a. Increase
b. Decrease
c. DK/NS *(Skip to 15)*

14b. **How did the implementation of these measures <increase/decrease> <u>equipment life</u> at your company?**

(Probe for details, get the story, and record open-ended response)

_____
_____
_____
_____
_____

14c. **We would now like to obtain some idea of what the financial value of this change means to your firm. We realize that you will not be able to provide precise responses to these questions, but we are interested in your best estimate for these questions.**

What is your best estimate of the <u>annual dollar value</u> of this <increase/decrease> in <u>equipment life</u>?

c) Record annual dollar value: $_____
d) DK/NS →

14d. **We realized that giving a value to this question is difficult. If you were to estimate a range of values that you think might reflect the value of this benefit, what would be the low end and the high end of that estimated range?**

a. Low end of estimate $ _____ High end of estimate $ _____
b. DK/NS

*Note: For question 15, if the company is an industrial facility, use "**productivity**". If it is a commercial business, use "**sales**".*

15. Has there been an increase or a decrease in your company's <u>productivity or sales</u>?

a. Yes
b. No *(Skip to 16)*
c. DK/NS *(Skip to 16)*

15a. **Have you experienced an increase or decrease in <u>productivity or sales</u>?**

a. Increase
b. Decrease
c. DK/NS *(Skip to 16)*

15b. **How did the implementation of these measures <increase/decrease> <u>productivity or sales</u> at your company?**

(Probe for details, get the story, and record open-ended response)

_____
_____
_____
_____
_____

15c. **We would now like to obtain some idea of what the financial value of this change means to your firm. We realize that you will not be able to provide precise responses to these questions, but we are interested in your best estimate for these questions.**

What is your best estimate of the <u>annual dollar value</u> of this <increase/decrease> in <u>productivity or sales</u>?

e) Record annual dollar value: $_____
f) DK/NS →

15d. **We realized that giving a value to this question is difficult. If you were to estimate a range of values that you think might reflect the value of this benefit, what would be the low end and the high end of that estimated range?**

a. Low end of estimate $ _____ High end of estimate $ _____
b. DK/NS

16. Has there been an increase or a decrease in your company's <u>waste generation</u>?

a. Yes
b. No *(Skip to 17)*
c. DK/NS *(Skip to 17)*

16a. **Have you experienced an increase or decrease in <u>waste generation</u>?**

a. Increase
b. Decrease
c. DK/NS *(Skip to 17)*

16b. **How did the implementation of these measures <increase/decrease> <u>waste generation</u> at your company?**

(Probe for details, get the story, and record open-ended response)

_____
_____
_____
_____
_____

16c. **We would now like to obtain some idea of what the financial value of this change means to your firm. We realize that you will not be able to provide precise responses to these questions, but we are interested in your best estimate for these questions.**

What is your best estimate of the <u>annual dollar value</u> of this <increase/decrease> in <u>waste generation</u>?

g) Record annual dollar value: $_____
h) DK/NS →

16d. **We realized that giving a value to this question is difficult. If you were to estimate a range of values that you think might reflect the value of this benefit, what would be the low end and the high end of that estimated range?**

a. Low end of estimate $ _____ High end of estimate $ _____
b. DK/NS

17. **Has there been an increase or a decrease in your company's <u>defects and/or errors</u>?**

a. Yes
b. No *(Skip to 18)*
c. DK/NS *(Skip to 18)*

17a. **Have you experienced an increase or decrease in <u>defects and/or errors</u>?**

a. Increase
b. Decrease
c. DK/NS *(Skip to 18)*

17b. **How did the implementation of these measures <increase/decrease> <u>defects and/or errors</u> at your company?**

(Probe for details, get the story, and record open-ended response)

_____

_____
_____
_____
_____

17c. **We would now like to obtain some idea of what the financial value of this change means to your firm. We realize that you will not be able to provide precise responses to these questions, but we are interested in your best estimate for these questions.**

What is your best estimate of the <u>annual dollar value</u> of this <increase/decrease> in <u>defects and/or errors</u>?

i) Record annual dollar value: $_____
j) DK/NS →

17d. **We realized that giving a value to this question is difficult. If you were to estimate a range of values that you think might reflect the value of this benefit, what would be the low end and the high end of that estimated range?**

a. Low end of estimate $ _____ High end of estimate $ _____
b. DK/NS

18. Aside from energy savings, can you think of any other costs or benefits, to you or your company, associated with the assessment that we have not mentioned yet?

a) Yes
b) No *(Skip to 19)*
c) DK/NS *(Skip to 19)*

18a. **What are the other costs or benefits?** *List:*
"Other 1": _____
"Other 2": _____
"Other 3": _____

18b. **Has there been an increase or a decrease in your company's** <u><"Other 1"></u> **that were in any way influenced by the measures (*or recommendations*) you installed?**

a. Increase
b. Decrease
c. DK/NS *(Skip to 19)*

18c. **How did the implementation of these measures <increase/decrease> <u><"Other 1"></u> at your company?**

(Probe for details, get the story, and record open-ended response)

_____

_____
_____
_____
_____

18d. **We would now like to obtain some idea of what the financial value of this change means to your firm. We realize that you will not be able to provide precise responses to these questions, but we are interested in your best estimate for these questions.**

What is your best estimate of the <u>annual dollar value</u> of this <increase/decrease> in <u><"Other 1"></u>?

a) Record annual dollar value: $_____
b) DK/NS →

17d. **We realized that giving a value to this question is difficult. If you were to estimate a range of values that you think might reflect the value of this benefit, what would be the low end and the high end of that estimated range?**

a. Low end of estimate $ _____ High end of estimate $ _____
b. DK/NS

(Repeat for "Other 2" and "Other 3")

19. What did you like most about this program?

20. What did you like least about this program?

21. If you could change one thing about the program, what would it be?

22. Given the current state of the economy, is your company more or less likely to investigate and implement energy saving measures?

23. Have you recommended this program to others?

a. *If yes*, **How many companies did you refer to this program?**
i. Who or what company did you refer to this program?

We have completed the survey. Thank you for your time. Are there any questions comments you have for me or that you would like for me to convey to Duke Energy?

Appendix C: Responses to Installation Questions

The following pages consist of a table that lists each of the recommendations and the outcome of that recommendation for each of the eight facilities for which we were able to complete an interview.

The facilities are listed in no particular order.

Facility #	On/Off Site	# of Recom-mendations	Measure	Installed	Months	Note	What Duke Can Do
EA-00075	Off	10	Utilize Energy Profiler Online (EPO)	No		Have not had time	
EA-00075	Off	10	Implement Energy Awareness strategies	No		Have not had time	
EA-00075	Off	10	Reduce compressed air pressure	No		Not mechanically possible	
EA-00075	Off	10	establish air leak check program	Yes		Already doing where practical	
EA-00075	Off	10	install programmable thermostats	No			
EA-00075	Off	10	consider high-bay lighting changes	Yes	1		
EA-00075	Off	10	replace T12 with T8 lighting	No		Not applicable	
EA-00075	Off	10	motor management policy	Yes		Already doing	
EA-00075	Off	10	steam trap check program	No		Have not had time	
EA-00075	Off	10	insulate screw barrels on extruder machines	No		Not feasible with plant layout	
EA-00176	Off	6	Utilize Energy Profiler Online (EPO)	No		Have not had time	
EA-00176	Off	6	Install programmable thermostats	Yes		Upgrades to central HVAC	
EA-00176	Off	6	Metal halide to T5 conversion	Yes	3		

EA-00176	Off	6	Repair and install economizers	Yes		Already doing	
EA-00176	Off	6	T8 to T5 conversion	No		Long payback	Give more rebates
EA-00176	Off	6	Water filled cooler system	No		No capital to take action	
EA-00493	Off	4	Upgrade air cooled chiller with high efficiency units	No		Need funding	Give rebates
EA-00493	Off	4	Utilize thermal storage for HVAC	No		Not practical	
EA-00493	Off	4	Centralized Energy Management and Security controls	No		Status unsure	Offer rebates and design resources
EA-00493	Off	4	Lighting	No		Initial cost too high	Give better rebates
EA-00532	Off	5	VFD Addition to chiller	No		ROI insufficient	
EA-00532	Off	5	Free cooling	No		In next year's budget	
EA-00532	Off	5	Turn off in-room televisions	Yes		Already doing	
EA-00532	Off	5	Integrate control system in in-room HVAC units	No		Getting numbers, researching	
EA-00532	Off	5	Establish compressed air leak check program	Yes		Already doing	
EA-00557	Off	7	Utilize Energy Profiler Online (EPO)	No		Lack of time	
EA-00557	Off	7	Implement Energy awareness strategies	No		Lack of time	
EA-00557	Off	7	Revise temperature setback strategy	No			
EA-00557	Off	7	Refrigeration opportunities	No			
EA-00557	Off	7	consider pre-cooling (temp floating)	No		Status unsure	

EA-00557	Off	7	Install and maintain economizers on HVAC	No		Removing economizers	
EA-00557	Off	7	Install exhaust hood fan controls	Yes	18		
EA-00209	On	12	Continuous monitoring and sustainable commissioning	No		Budget not approved	
EA-00209	On	12	New plate and frame heat exchanger	No		Budget not approved	
EA-00209	On	12	Install a smaller boiler for summer	No			
EA-00209	On	12	Reduce boiler pressure	No			
EA-00209	On	12	Replace domestic hot water heaters with instantaneous type heaters	No			
EA-00209	On	12	Siemens DOC control system upgrades and optimization	No			
EA-00209	On	12	Retrofit walk-in coolers and freezers with new cooling system	Yes	12		
EA-00209	On	12	Install VFDs on air handlers with inlet guide vanes	No			Give incentives
EA-00209	On	12	T12 to T8 lighting retrofit	No			Give incentives
EA-00209	On	12	Install cooling tower make-up water deduct meter	Yes			
EA-00209	On	12	Steam trap survey and repair	Yes		Already doing	
EA-00209	On	12	Lighting upgrade	No			Give incentives
EA-00214	Off	2	Variable pump speed controllers	No			

EA-00214	Off	2	Lighting upgrades	Yes	1		
EA-00058	Off	4	Load Shifting	No		Would affect morale poorly	
EA-00058	Off	4	Compressed air system repair and maintenance program	Yes	1		
EA-00058	Off	4	High efficiency motor replacement program	No		ROI not sufficient	Give incentives
EA-00058	Off	4	Lighting - metal halide to T5 & T12 to T8 replacements	No		ROI not sufficient	
EA-00070	On	9	Utilize Energy Profiler Online (EPO)	Yes		Already doing	
EA-00070	On	9	Implement an Air Leak Check program	No		ROI not sufficient	
EA-00070	On	9	Implement an Steam Trap Audit program	Yes		Already doing	
EA-00070	On	9	Install Control System for Tenter Frame Exhaust	Yes	1		
EA-00070	On	9	Replace Standard Metal Halide lamps with Pulse Start MH	No		Not cost effective	
EA-00070	On	9	Replace High Pressure Sodium lamps with Pulse Start MH	No		ROI not sufficient	
EA-00070	On	9	Motor management policy	Yes		Already doing	
EA-00070	On	9	Install Occupancy Sensors	No		Not cost effective	
EA-00070	On	9	Install pre-Heater to Tenter Frames	No		ROI not sufficient	
EA-00215	Off	1	Lighting replacements	No		Not cost effective	

EA-00301	Off	8	Utilize Energy Profiler Online (EPO)	Yes		Already doing	
EA-00301	Off	8	Exit sign retrofit	No		Doing at failure	
EA-00301	Off	8	Put water heaters on a timer	No		Turned down temp instead	
EA-00301	Off	8	Energy star vending machines	Yes	18		
EA-00301	Off	8	Lighting retrofit - 32w to 28w T8 retrofit	Yes	1		
EA-00301	Off	8	occupancy sensors	No			
EA-00301	Off	8	implement Office equipment efficiency measures	Yes	1		
EA-00301	Off	8	water cooled chiller system	No		Not cost effective	
EA-00511	Off	8	Compressed air shutoff and leak repair	No		Not cost effective	
EA-00511	Off	8	Air compressor control system	No		Not cost effective.	
EA-00511	Off	8	Demand control	No		Not cost effective	
EA-00511	Off	8	Thermal storage	No		Not cost effective	
EA-00511	Off	8	Lighting	Yes	3		
EA-00511	Off	8	Install plate heat exchanger for winter free cooling	No		Not cost effective	
EA-00511	Off	8	Repair economizer dampers	No		Not cost effective	
EA-00511	Off	8	VFD on secondary chilled water and process cooing pumps	No		Not cost effective	
EA-00512	Off	8	Boiler pressure reduction	No		Too risky	
EA-00512	Off	8	Boiler replacement	No		In 5-year plan	

EA-00512	Off	8	Potential process heating applications	No		Too risky	
EA-00512	Off	8	Replace chiller	No			
EA-00512	Off	8	Establish a Motor Management policy	No			
EA-00512	Off	8	Compressed air leak check program	No		Starting after interview	
EA-00512	Off	8	Flow meter calibration	No		Will replace next year	
EA-00512	Off	8	Install VFD compressor	No		Not cost effective	
EA-00184	Off	6	Utilize Energy Profiler Online (EPO)	No		Low payback	
EA-00184	Off	6	Implement an Air Leak Check program	Yes	1		
EA-00184	Off	6	T12 to T8 lighting retrofit	No		Future project	
EA-00184	Off	6	compressed air -install storage tanks	No		Not enough time or money	
EA-00184	Off	6	HVLS fans to replace personal cooling fans	Yes	18		
EA-00172	Off	5	Seal HVAC ducts	No		Ducts are in conditioned space	
EA-00172	Off	5	Improve building envelope	No		Not cost effective	
EA-00172	Off	5	Metering and controls	No		ROI not sufficient	
EA-00172	Off	5	Food service testing	No		Doing in remodels and new stores only	
EA-00172	Off	5	Temperature floating	Yes		Already doing	

Final Report

Evaluation of the Non-Residential Smart $aver® Custom Program in North and South Carolina

Results of a Process Evaluation

Prepared for
Duke Energy

139 East Fourth Street
Cincinnati, OH 45201

Draft: April 27, 2011
Finalized: August 12, 2011

Submitted by:

Subcontractor:
Carol Yin
Yinsight, Inc.

Nick Hall
TecMarket Works
165 West Netherwood Road
Oregon, Wisconsin 53575
(608) 835-8855

Table of Contents

Executive Summary

Summary of Findings

This Executive Summary provides an overview of the key findings identified through this evaluation.

Significant Process Evaluation Findings

Duke Energy's Smart $aver® Custom program is playing an important role in helping non-residential customers to implement projects using measures not in the Smart $aver® Prescriptive program. The program is also being marketed very well, through a network of dealers and distributors, as well as through Duke Energy's account managers. While all customers appreciate that Duke Energy offers a Custom program, they are only moderately satisfied with the program. Two areas where customers express less satisfaction are in the application's difficulty and in the time for application review. Duke Energy's Smart $aver® Custom program managers are well aware of the challenges facing their program, and have already taken steps to address them. Smaller customers find that the application is difficult if the applicant does not have a technical or engineering background. Duke Energy's program managers report that the time to review larger project applications is only marginally greater than the time to review smaller project applications. They also report that while the program's overall success depends critically on those larger projects, they are expending the majority of their resources on reviewing the smaller applications. As it is right now, the Smart $aver® Custom program may have reached a point of equilibrium, with the difficulty of the application process serving to reduce the number of applications from the smaller projects.

Recommendations

1. Duke Energy should decide what size projects (in terms of energy savings) the Custom program should target. Duke Energy program managers have expressed a greater need to encourage larger projects, in order to increase program effectiveness. Duke Energy may determine that it is not cost prohibitive to provide technical support for all the "onesie, twosie" projects. Whether or not Duke Energy decides to support projects of all sizes, making an explicit decision one way or the other may allow Duke Energy to allocate their resources and outreach more efficiently.
2. If Duke Energy decides to continue to encourage customers with smaller projects to apply, Duke Energy should find a way to provide technical support to qualified unassigned customers who are filling out their own applications. Alternately, Duke Energy may also want to consider temporarily assigning those customers to a Duke Energy representative, or temporarily requesting technical assistance from WECC to meet those unassigned customers' needs. This would allow those smaller customers to receive the assistance they say they need.
3. Duke Energy should also consider managing all customers' expectations for the amount of work involved in filling out an application, and perhaps provide data on what types of

projects had been approved in the past. This may allow customers to make more informed choices on whether it is worthwhile for them to undertake the work of applying.

Introduction

This process evaluation of the Smart $aver® Custom program was conducted through in-depth interviews with the Duke Energy program manager for the OH program and the Duke Energy program manager for the Carolinas program. Short interviews were also conducted with 11 Duke Energy nonresidential customers and 10 vendors who had submitted applications for the Custom program. The Smart $aver® Custom program is offered in all five states in Duke Energy service territory. This evaluation focuses on the Smart $aver® Custom program being offered in the Carolinas and Ohio; the program is identical across the three states and the two program managers coordinate all activities.

Program Description

The Duke Energy Smart $aver® Custom program is intended to supplement the Smart $aver® program, which provides prescriptive rebates on pre-selected measures. Customers who want to install measures not on the Smart $aver® prescriptive list are provided the opportunity to apply for a rebate through the Custom program. One Duke Energy manager states, "*We lead with the prescriptive program.*"

The Custom program is tightly coordinated with the Smart $aver® prescriptive program: the program managers of both programs meet regularly, and any change to the Smart $aver® Prescriptive program is also made to the Custom program. One Duke Energy program manager reports that when the Custom program starts seeing repeated applications for the same measure, they begin considering that measure for inclusion in the prescriptive program, in order to lower administrative costs.

Process Evaluation

Program Design and Implementation

Duke Energy implements the Smart $aver® Custom program with support from the Wisconsin Energy Conservation Corporation (WECC). The Duke Energy program managers' responsibilities include overall management of costs and revenue, and management of the third party vendors who help deliver the program.

WECC provides support for the Smart $aver® Custom program in a number of ways. WECC representatives act as "trade ally representatives" and have supported Duke Energy's Smart $aver® programs over several years in building a "trade ally network". Dealers, vendors and distributors of energy efficient equipment constitute Duke Energy's trade allies. Through the network supported by WECC these vendors can receive information about Duke Energy's Smart $aver® program eligibility, program benefits, and application requirements. In many cases, WECC representatives serve as the main source of information about Duke Energy's Smart $aver® program. WECC also provides technical staff who helps Duke Energy review the custom applications.

Marketing

The Duke Energy program managers report that the Smart $aver® Custom program is not marketed as a separate program. "*We just market Smart $aver® incentives as a whole.*" The Custom program is designed for non-residential energy efficiency projects that propose to use measures not already approved in the Smart $aver® prescriptive measures program.

Program information and forms are available on Duke Energy's website. However, the main channels for marketing for the program are through vendors and through Duke Energy account managers. For Duke Energy customers who have been assigned to an account manager, that account manager serves as the primary contact and provides assistance with Custom program applications. For mass market or unassigned customers, Duke Energy markets the Custom program through trade shows and through their network of trade allies and vendors. The trade ally network is cultivated by WECC. Unassigned customers can also call a toll free number operated by a third party vendor with questions about the Custom program. "*I see a lot of volume through our trade allies*," one Duke Energy program manager reports. A Duke Energy program manager also reports that the Custom program is also marketed through pilot programs, such as the Smart Billing Advantage program, and the Energy Savings Master Plan programs. "*A lot of this is marketing internally, so our colleagues can market externally.*"

Applications

Applications can come in through the trade ally network, directly from the customer, or from the account manager on behalf of the customer. The Smart $aver® Custom application asks customers to provide information about their facility, information about the proposed project, equipment specification sheets, a calculation of energy savings from the project, and the payback period. The program manager reports that customers generally ask the equipment vendor to provide these calculations for them. The program manager acknowledges that this is not a simple process, "*It's only worthwhile for the large projects.*"

As part of the application process, customers are required to answer questions that would determine whether they were a “free rider”. The term “free riders” refer to customers who would install the measures whether or not any rebate was given. Customers need to obtain approval for the rebate prior to commencing any work on the project, including signing any purchase orders with their vendors. Those who began their projects prior to application approval are disqualified from the rebate because they are considered freeriders and therefore do not provide net energy savings for the program. This approach keeps the program cost effective and assures low freeridership.

Application Review

Once a custom application is submitted, the Duke Energy program managers conduct a quick initial screening to determine if the application must be disqualified due to obvious reasons, such as missing information. The application then undergoes a technical review by in house staff, or is sent to WECC for review by their engineers. WECC makes sure the applications are complete, and contacts the customer if any information is missing or needs clarification. Duke Energy’s program managers try to review as many applications as they can themselves. The technical reviewers determine the energy savings that can be expected from each project.

The turnaround time on the technical reviews had been one month, but recently increased to six weeks. At the time of these interviews, WECC had recently expanded their scope of work with Duke Energy to include conducting technical reviews for the Custom program. WECC was in the process of developing the additional capacity to process Duke Energy’s applications in much shorter periods of time. One Duke Energy program manager acknowledges that some of the delay may be due to that: “*They’ve been building up their knowledge,*” but also believes that once WECC finishes staffing up, this timing problem will be resolved.

Duke Energy is aware of the complexity of the custom application, “*We get the complaint all the time that the custom application is too hard and too complicated. We have ideas on how to make it easier, but at the end of the day, the customer or vendor still needs to tell us about the project. We cannot take on the work of doing that for them.*” Because incentive decisions must be made based on the energy savings of each project, the application must provide the information needed to make cost effective energy efficiency supply decisions.

Incentive Calculation

The energy savings calculations are sent to Duke Energy’s Market Analytics division, which determines how much revenue Duke Energy can earn on the project through “Save-a-Watt”. This stage was taking two weeks, but the Duke Energy program manager is working to reduce the turnaround time to approximately one week. The Duke Energy program manager takes the revenue estimate and makes the final determination on what incentive amount is offered to the customer on their Smart $aver® Custom project. The customer then makes a decision whether or not to go forward with their proposed project, taking their other needs into consideration.

Results

Customer demand for the program is high. At the time of these interviews, the Duke Energy program managers report that they are ahead of program targets in the Carolinas. "*We have more requests than we can handle…"* One program manager reports that level of interest from customers recently had increased to the extent that it became another factor in the increased turnaround time for reviewing applications.

When asked what might have caused the increased level of interest, the Duke Energy program manager suggested it might simply be because "*Customers have started to hear about the program. Word gets out, customers say [I'll apply] when I get around to doing it. Even when they are aware of the program, takes a while to participate. [They may] want to wait until building is not occupied, etc.*"

Future Growth of the Custom Program

The program managers were asked about the possibility of future growth of the Custom program, in two ways: growth in terms of increased numbers of participants and growth in terms of types of technologies that are accepted.

When asked, one Duke Energy program manager was hesitant about what continued participant growth of the Custom program would entail. This program manager estimates, "*there are probably two or three incentives in each state that make up the vast majority of the overall revenue [from Custom] for Duke. [We usually get] a couple of projects that are so massive that they carry everything else. If those projects don't get done, we're not going to do well…We only need a handful of big projects, rather than a bunch of onesie and twosies.*" The program manager then suggested one approach that Duke Energy is considering, "*One way is to take the large project ideas and work with account managers to see if they have customers who may be interested."*

The Duke Energy program manager also cites market conditions as a consideration in their decisions about growing the Custom program. "*We have more applications that we approve than get implemented; that's because of economics.*" The program manager estimates that at that point, there were 69 applications across Duke Energy's service territory that had had been approved, but Duke Energy has no indication from the customers about whether they are planning to implement the projects.

In terms of growth in types of technologies allowed, the other Duke Energy program manager believes that the Custom program currently covers most of the opportunities in electric energy savings, but that more opportunities might be available if gas and electric utilities were allowed to work together and current regulations were changed to allow fuel switching. "*Geothermal applications will not take off until we let the gas companies participate.*"

Freeridership & Spillover – Manager Opinions

One Duke Energy program manager reports that there may be some freeridership in the Custom program, even though customers are prescreened for freeridership during the application stage. This low level of freeridership comes as a result of the other reasons customers have for undertaking their retrofit projects, and as a result of the algorithm used to quantify freeridership. To qualify for a program incentive, the customer's freeridership score is calculated based on a set

of questions provided to Duke Energy by TecMarket Works. These questions are included in the program application forms. Each applicant is required to complete the freeridership question battery from which the scores are calculated. Typically the customer simply answers the freeridership questions along with a set of other enrollment and project-related questions included on the application form. If a customer has issues with the freeridership questions or if a customer answers questions in a way that provides questionable or conflicting results, TecMarket Works evaluation staff conducted a telephone freeridership interview with the applicant and score their responses to the questions during the interview. Very few applicants had issues with the freerider questions. Duke Energy program managers used the freeridership score to estimate the level of incentive to be provided and to calculate the net cost effectiveness of each project submitted. According to Duke Energy managers, they were able to accept small levels of freeridership for the Custom projects as long as the project was cost effective on a net energy basis.

Spillover

The Duke Energy program managers only occasionally hear of instances of spillover from the Custom program, such as an anecdote about a customer who started a lighting project and ended up installing more lights than planned. However, spillover is not formally assessed in this study for the Custom program.

Freeridership Calculations

As noted above, the freeridership score is based on applicant responses to a battery of freeridership questions. The freeridership battery of questions consists of four questions and focuses on the impact of the Custom Program on the applicant's decision to implement their energy efficiency project. The scoring approach is a linear approach which allocates from zero percent to full freeridership (100%) scores based on the responses provided by the applicant to cause-and-effect-structured freeridership questions. Applicants with scores too low to make custom projects cost effective are rejected by the program and incentives are not paid.

This approach allows the pre-screening of projects so that only cost effective projects are funded. This approach pioneered by Duke Energy represents a "Best Practice" within United States for Custom programs because it helps assure that program funds are spent obtaining net new energy savings. Other approaches approve projects before the net savings are known, increasing the probability that program funds will be spent on projects that would have been implemented without the program's financial or informational assistance. The freerider questions used in this evaluation are presented below along with the scoring approach. The scoring approach *(in italics*) does not appear on the application form.

1. **Please indicate if the Duke Energy incentive is/was a factor in your choice to install the more energy efficient equipment instead of other equipment that may not have saved as much energy.**
    1. Incentive had an influence on the decision (*move to next question*)
    2. Incentive had no influence on the decision (*100% freerider*)

2. **If the Duke Energy incentive/program was a factor in your choice, please indicate how much of an influence the program incentive had on your energy efficient**

equipment choice. Please circle the number that best represents the influence the program has on your equipment choice. (*allowed responses = 0 to 10***)**

- 0 = The Duke Energy program had no effect on our equipment choice (*100% freerider*).
- 1 or 2 = The Duke Energy program may have a minor influence on our energy efficient equipment choice (*1=80% freerider; 2=70% freerider*)
- 3 or 4 = The Duke Energy program had a positive influence in our selection of energy efficiency equipment (*3=50% freerider; 4=40% freerider*)
- 5 or 6 = The Duke Energy program was one of the key reasons for the energy efficient equipment choice, but not the most important reason (*5=30% freerider 6=25% freerider*)
- 7 or 8 = The Duke Energy program was one of the most important reasons for the energy efficient equipment choice (*7=15% freerider 8= 10% freerider*)
- 9 or 10 = The Duke Energy program was the primary reasons for the energy efficient equipment choice (*9=5% freerider 10=0% freerider*)

3. **Do you think that you would have selected the same level of energy efficiency if the program information and technical assistance would not have been available to you?**
   A. No. We would make a somewhat different equipment selection of not do the same project (*decrease freerider score by 10% but not lower than 0%)*
   B. Not sure what we would do (*no change in score*)
   C. Yes. We would make exactly the same equipment choice (*increase freeridership score by 10% but no higher than 100%)*

4. **Do you think that you would have selected the same level of energy efficiency if the program's financial incentive would not have been available to you?**
   A. No. We would make a somewhat different equipment selection or not do the same project (*decrease freerider score by 25% but no lower than 0%)*
   B. Not sure what we would do (*no change in score*)
   C. Yes. We would make exactly the same equipment choice (*increase freerider score by 25% but no lower than 100%*)

In order to estimate program-wide freeridership the scores, the results of the scores for each incentivized (approved) application were tabulated by TecMarket Works and weighted by the percent of each project's ex ante energy savings compared to the total program-wide ex ante savings. This approach is taken because of the wide range of levels of energy savings among the custom projects that prohibited the use of un-weighted (averaged mean) scores, and provides an average freeridership score that reflects the energy savings that are not counted as program-induced across the entire set of participants. The results of this assessment confirm that the pre-screening of applications, including the use of net energy savings calculated incentives, results in very low levels of freeridership and a high level of net energy savings. The following table

presents the results of the scoring process and presents both the un-weighted and the ex ante energy savings weighted freeridership scores.

State	Number of Applicants in Freerider Assessment	Mean Non-Energy Weighted Freeridership Score	Mean Ex Ante Energy Weighted Freeridership Score	Net-to-Gross Ratio
North and South Carolina	121	17.9%	20%	0.8

Customer and Vendor Interviews

Short interviews were conducted with 11 customers and 10 vendors. In these 15-minute interviews, respondents were asked to provide feedback on their experiences with aspects of the Custom program as well as provide satisfaction ratings. Respondents were assured their answers would remain anonymous and were allowed to decline to answer any of the questions. The sample sizes are too small to allow response to be considered statistically representative; as a result, the responses should be considered indicative of the program but should not be generalized to all Custom program participants. Survey instruments were used as guidelines for the interviews. These interviews are intended to gather some concrete examples of some of the issues that Smart $aver® Custom applicants have faced, and to allow the evaluation team to delve into issues more deeply than would be possible in a typical customer satisfaction survey.

Table 1. Sample Disposition

Completed	19
Couldn't Remember Details	2
Declined	3
Left Company	6
Out of Business	1
Retired	1
No Response	6
No Show	3

The sample was drawn from the pool of customers who had received notification in late 2009 through 2010 from Duke Energy about whether their applications were approved or denied. An average of 2.14 phone calls were made and 0.68 emails were sent to each of the 41 people in the sample, with an overall response rate of 46%. Across the sample, 8 respondents had their projects approved, completed and rebated; 6 had their applications denied, and 7 had their applications approved but Duke Energy did not know the status of their projects. See Table 1 for the sample disposition.

Table 2. Satisfaction with the Custom Program

	Satisfaction with Incentive	Ease of Filling Out Application	Satisfaction with Time to Review Application	Satisfaction with Technical Expertise of Duke Energy Staff	Satisfaction with Program Information Provided	Overall Satisfaction with Smart $aver® Custom
Mean Rating	7.00	6.63	7.37	7.88	7.73	7.70
Std Dev	2.86	2.25	2.78	1.81	1.67	2.25
N	15	13	16	9	14	16

Note: Ratings are on a scale of 0 to 10, with 10 being highest and 0 being lowest. Some ratings were not solicited from the respondent if they were not appropriate, for example if the customer did not fill out the application, or if no technical help was requested from Duke Energy.

Satisfaction Ratings

While not statistically representative, the satisfaction ratings may be used as an indication of trends among the customer and vendors. These ratings suggest that while there is moderate satisfaction with the Custom program overall, there may be less satisfaction with the incentive level, with the application process, and with the time it takes for Duke Energy to review the applications (all rated below 7.5). These trends in the satisfaction ratings are reflected in the interviewee's feedback, reported below.

Awareness of the Smart $aver® Custom Program

Respondents were asked how they first heard about the Custom program. The Smart $aver® program and the trade ally network were designed so the Duke Energy account managers would market to large customers, vendors would market to the mass market (including unassigned customers), and WECC would provide technical support the vendors. Through the interviews, this was exactly what was found: Customers tended to report that they first heard about the Custom program from their vendor or Duke Energy representative. Vendors tended to have first heard about the program from WECC. Duke Energy's website was mentioned only a couple of times by both customers and vendors as their first exposure to the Custom program. Customers also reported that they were able to get all the information they needed from their source. Vendors also reported that their source, WECC, was able to provide all the information they needed.

The relationship between the vendors and WECC seems to be an excellent one. Most vendors referred to their WECC representative by name, and highly praised WECC's support: *"Great support from Rob", "Rob knows this thing inside and out. Rob is indispensible so to speak", "Everybody in our area knows Rob.", "When you mention the rebate program, Rob's name comes up. He's the area expert." "I give WECC a 10+ [satisfaction rating out of 10 maximum]"*

Feedback on the Influence of the Rebate

Customers generally reported that the rebate was a major influence on their decision to do the project. One customer said the influence of the rebate was "*one of more important; if it had been offered by the other utility we would have thought about switching [to the other utility]."* One vendor offered that the rebate was "*extremely crucial; that was what the project hinged upon.*"

When asked what they would have done (or did) in the absence of a rebate, customers were evenly divided among those who said they would not have done the project, those said they would have had to use less expensive equipment, and those who would have scaled back or delayed the project. Likewise, most customers reported their primary reason for undertaking their projects was to lower energy costs. Two of them reported that their primary motivation was to replace aging (but still functional) equipment; one would have had to select cheaper equipment without the rebate, and the other would not have been able to do the project without the rebate. One customer reported he wanted to lower his peak demand use, because his energy costs for the rest of the year were to be calculated off his peak usage. Only one customer reported that the Custom rebate would have only played a small part in the advancement of the project; that customer also had his application denied. These responses indicate that the freerider screen is working and assures that the program is the primary or one of the important drivers of the energy efficient changes being made. These responses also indicate that when the program is not a main reason for the change, that project is not approved, helping to maintain cost effectiveness, but at the price of lower levels of satisfaction especially from denied applications.

Feedback on Application Process

Technical content of applications. Customers and vendors had mixed reactions when asked if the application was easy to understand. There were two respondents who said it was easy if you knew what you were doing, or if you had a mechanical background. The others needed to engage with the technical review team to answer additional questions and the delays arising in the second or third rounds of questions were mentioned as difficulties with the application. One customer had difficulty because the application required information about the existing lights, but he didn't have the records due to the age of the building. Another customer reported the application contained an unclear question and that they couldn't find anyone to help them at Duke Energy. One customer suggested that Duke Energy could have a representative assist the businesses that were filling out the applications by themselves.

In contrast, vendors who were filling out the applications for customers also had questions, but most of them reported that they were answered by WECC.

Delays during the application approval process. Several respondents discussed issues related to the application approval time. One customer was dealing with a Duke Energy representative who went on leave and experienced "*five months of transferring. I was on a deadline. Got to a point where I couldn't get a hold of anyone. [Original rep's phone message said] call this number, but that [voice mailbox] was full*." Two vendors mentioned that it took a long time and many phone calls to meet the Custom program's calculation requirements, particularly exacerbated by the fact that their clients were on a deadline. This is a problem of which Duke Energy program managers are well aware, and as discussed elsewhere in this report, the managers are currently working to shorten the approval process by working with third party vendors to provide more technical assistance.

The complexity of the application process does serve as a deterrence to some prospects. Two vendors mentioned that they have declined to submit applications. "*I'll ignore jobs that require the custom rebate, I'm [just] selling the materials and don't charge for [submitting] the*

application; I need an answer on a rebate within a day." This vendor had already had a negative experience with a two month long delay after submitting the application. Another vendor reports, "*sometimes it's not worth it. I did a whole project for $9 cheaper a ballast [rather than doing the paperwork]. I don't usually [absorb the costs] I just don't say anything [about the rebate] sometimes*."

While it may be discomfiting to some to hear that there are vendors who do not want to participate in the Custom program because the application process is too complicated or drawn out, this may act as a filter that helps Duke Energy better serve customers with larger projects that have higher impact. Duke Energy program managers have already mentioned that there needs to be a balance between serving as many customers as possible and remaining cost effective as a program. As one vendor puts it, "*The process for custom is tedious. You have got to really want to do it…it eliminates a lot of the smaller projects*."

This is not to say that Duke Energy does not need to continue refine program operations and reduce the delays that affect customers. Rather, Duke Energy should find a way to manage customer expectations so that customers are aware the Custom program may not suitable for smaller projects. Customer and vendor interview responses suggest that vendors may currently be providing that filtering, in deciding not to mention rebates for certain projects. However, not every customer chooses to work with vendors, and it is that group of customers whose expectations may need to be addressed.

Rebate Checks

For those who completed their approved projects and received the rebate, there were no reports of problems associated with receiving the checks. One vendor praised the speed with which the checks were sent out. "*Their turnaround time is phenomenal."*

Most Successful Aspect

When asked to state the most successful aspect of the Custom program, some respondents stated that the fact that Duke Energy provides the Custom program is valuable in itself. "*We're glad that Duke has been partnering with us and giving us something [to work with]". "I really like the custom program. It enables you to kind of go outside the box.", "The fact that custom exists: so that if you do something that's not prescriptive you still get some incentive for doing it."* Another customer reports the Custom rebate was a selling point for their management.

Top Priority for Improvement

When asked which area should have top priority for improvement, responses were varied, sometimes reflecting a lack of knowledge of program requirements. One customer wanted to be able to apply for a Custom rebate retroactively, after completing a project. Another customer wanted Duke Energy to streamline the application process so that customers could apply without having to have vendors sign off on the application. Another customer echoed that suggestion, saying when she had to involve vendors she felt obligated to compensate them, but she only had enough budget to install the fixtures with in-house staff. One customer who had extreme difficulty finding help when her original contact at Duke Energy went on leave wanted to be able

to check the status of an application online. Several suggested that Duke Energy make it a top priority to find a way to reduce uncertainty about the amount of the rebate.

Increasing Participation

When asked if they had any suggestions on how Duke Energy could increase participation, six respondents suggested more marketing. They believe that a lot of people are not well informed about the benefits of the program. Two vendors suggested that Duke Energy could increase participation by "blessing" qualified vendors, citing the need to overcome customers' distrust because the incentives sounded too high: "*I don't think they actually believe the numbers*" and "*People know there are new lights and they saves energy, but they have no idea how much. People roll their eyes and walk away because it sounds too good to be true*." One vendor mentioned that having Duke Energy account managers involved to provide customer rate information would be helpful.

Comparisons to Other Utilities

Vendors who worked with clients of other utilities did make some unsolicited comparisons. While they were appreciative that Duke Energy offers a Custom program, the most frequent comparison was that Duke Energy's program was harder to sell than those of other utilities because of the uncertainty involved in the amount of the rebate. Another common comparison was that other utilities had online application submission: "*Hand writing and printing and scanning [the application] is old school…a lot of other utilities have spreadsheets that you populate*." Duke Energy program managers report that while applications cannot be submitted online, they are already developing spreadsheets for certain Custom measures including lighting, VFDs and compressors that allow fields to be auto-filled with calculations once certain parameters are entered.

Overall, the vendors had no serious issues "*Very easy to work with Duke*."

Program Improvements Under Way

Duke Energy's program managers report that they already have a worksheet-based application for custom lighting projects and that they are currently developing a similar application for VFDs and air compressors. These templates have been completed and were being tested at the time of these interviews, with an anticipated release date at the end of January of 2011. The Custom program staff is also in the process of putting together some case studies, targeted to specific market segments.

The program managers are aware of customer dissatisfaction with the application response times and are working to reduce the time to one month. However, one program manager cautions, "*it's a careful balance. The market moves very fast, and we don't let it govern the quality of our review, but customer satisfaction would be diminished if they had to wait [longer]…I would say the quality of the review is high; I feel confident when M&V comes back, based on the information we've reviewed [to determine the level of incentives], it would be very cost effective.*"

In Summary

The program managers seem well aware of the major issues that face their program: long turnaround times and the complexity of the Custom application process. They are actively working to address these issues. However, Duke Energy may need to make a business decision about whether they should overtly focus projects with higher impacts, and become more selective about which small projects are cost effective to support, and manage customer expectations so that only projects with larger impacts would likely apply. Conversely, if Duke Energy decides that all customers who pay the rider need to be served equally, then the unassigned customers who choose to fill out their own applications should be provided some technical assistance with the application or provided direction as to where they might obtain technical resources.

There is agreement among the interviewees that the Custom program has significant value. As one Duke Energy program manager says, "*There's no question that customers are coming up with interesting and unique projects that would never fit in the prescriptive program. It's really important that we have the custom program to offer them. There are really interesting projects that have very large impacts that are out there…that makes everyone happy.*"

Appendix A: Program Manager Interview Protocol

Name: _____

Title: _____

Position description and general responsibilities:

_____

_____

_____

We are conducting this interview to obtain your opinions about and experiences with the Commercial and Industrial Incentive Program. We'll talk about the Program and its objectives, your thoughts on improving the program and its participation rates, and the technologies the program covers. The interview will take about an hour to complete. May we begin?

Program Objectives

1. In your own words, please describe the Commercial and Industrial Incentive Program's objectives.

2. In your opinion, which objectives do you think are being met or will be met? How do you think the program's objectives have changed over time?

3. Are there any program objectives that are not being addressed or that you think should have more attention focused on them? If yes, which ones? How should these objectives be addressed? What should be changed? Do you think these changes will increase program participation?

4. Should the program objectives be changed in any way because of market conditions, other external or internal program influences, or any other conditions that have developed since the program objectives were devised? What changes would you put into place, and how would it affect the objectives?

5. Do you think the incentives application process offered through the C&I Incentive program is easy to understand and complete?

6. Do you think the incentives offered through the program are large enough to entice the C&I community to purchase the high efficiency items? Why or why not?

7. Do you think the incentives cover the right equipment? Do you think there is equipment that is currently incentivized that should not be, or equipment that is not covered that should be?

8. Which measures have been most used?

9. What kinds of marketing, outreach and customer contact approaches do you use to make your customers aware of the program and its options? Are there any changes to the program marketing that you think would increase participation?

10. How do you inform trade allies and contractors about the program? How effective has this been in getting participation from the contractors?

11. Are there any changes to the incentives or marketing that could possibly increase participation in the program?

12. Thinking about how your program enrolls participants, what do you think your level of freeridership is for this program? (*That is, what percent of the equipment rebated through the program would have been purchased and installed without the program's incentive?*)

13. What do you think the level of spillover is for this program? *(That is, what percent of the participants take similar actions in their business that are not rebated through the program?)*

Overall C&I Incentives Management

14. Describe the use of any advisors, technical groups or organizations that have in the past or are currently helping you think through the program's approach or methods. How often do you use these resources? What do you use them for?

15. Overall, what about the Commercial and Industrial Incentive Program works well and why?

16. What doesn't work well and why? Do you think this discourages participation?

17. Can you identify any market or operational barriers that impede a more efficient program operation?

18. If you had a magic wand and could change any part of the program what would you change and why?

Program Design & Implementation

19. What market information, research or market assessments are you using to determine the best target markets or market segments to focus on?

20. What market information, research or market assessments are you using to identify market barriers, and develop more effective delivery mechanisms?

21. How do you manage and monitor or evaluate contractor involvement or performance? What is the quality control and tracking process? What do you do if contractor performance is exemplary or below expectations?

23. In your opinion, did the incentives cover enough different kinds of energy efficient products?

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If no, 23b. What other products or equipment should be included? Why?

_____

_____

24. In what ways can the Commercial and Industrial Incentive Program's operations be improved?

25. Do you have any suggestions for how program participation can be increased?

Appendix B: Participant Survey Instrument, Closed Won

Name: _____
Company: _____
Title: _____

Hello, my name is _____. I am calling on behalf of Duke Energy to conduct a customer satisfaction interview about the Smart $aver® Custom Program. May I speak with _____ please?

If person talking, proceed. If person is called to the phone reintroduce.
If not free to talk, ask when would be a good time to call and schedule the call-back:

Call back 1:	Date: _____,	Time: _____ ❑AM or ❑PM
Call back 2:	Date: _____,	Time: _____ ❑AM or ❑PM
Call back 3:	Date: _____,	Time: _____ ❑AM or ❑PM
Call back 4:	Date: _____,	Time: _____ ❑AM or ❑PM
Call back 5:	Date: _____,	Time: _____ ❑AM or ❑PM

❑ Contact dropped after fifth attempt.

We need your help. Duke Energy has given us your name as someone who might be able to share some of your experiences with the Smart $aver® Custom Program. We are not selling anything. We would like to conduct a short interview that will take about 15-20 minutes and all your answers will be kept confidential. This information will enable Duke to make improvements to the program and the application process. Would you be able to help us?

Establishing Questions:

ES-0. **Would you please tell me what your company does, and what your role is in your company?** _____

ES-1. **Our records indicate that you participated in the Smart $aver® Custom Program in <date> and that you installed <technology> through the program and received an incentive for your purchase. Do you recall participating in this program?**

1. ❑ Yes, *begin* — *Skip to Q2.*
2. ❑ No,
99. ❑ DK/NS

1a. **This program was provided through Duke Energy. In this program, your company installed <technologies>. In exchange for purchasing the energy efficient option, Duke Energy provided your company with an incentive.**

Do you remember participating in this program?

1. ❑ Yes, *begin* → *Go to Q2.*
2. ❑ No,
99. ❑ DK/NS

If No or DK/NS terminate interview and go to next participant.

ES-3. **Please tell me what you remember about the project: How long did it take? Why did you decide to undertake the project at that time, rather than sooner or later?**_____

Information-Gathering Phase

INFO-1. **How did you become aware of the Smart $aver® Custom Program?**

a. ❑ Duke Energy sent me a brochure
b. ❑ A Duke Energy representative told me about it
c. ❑ Duke Energy website.
d. ❑ A contractor I was working with told me about the program
e. ❑ An equipment supplier
f. ❑ I saw an ad in _____
g. ❑ Other _____
h. ❑ DK/NS

INFO-2. **At the time you became aware of the program and considered taking advantage of the incentive, did you do any additional investigation to confirm the program's participation requirements and program benefits, or was the information you had enough for you to make a participation decision?**

a. ❑ The information received was adequate
b. ❑ Didn't need to confirm/ already knew about it
c. ❑ Went to the program or Duke Energy web site
d. ❑ Called or emailed a Duke Energy contact
e. ❑ Called or emailed a contractor
f. ❑ Called or emailed an equipment salesperson
g. ❑ Other: _____
h. ❑ DK/NS

If c, d, e, f, g:

INFO-3. **Were you able to get the information you needed about the program's participation requirements and benefits?** *Note: many may have only heard about this through their contractors and thus had minimal involvement, so this question may only apply to a few of them.*

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

INFO-4. **While you were deciding whether or not you wanted to participate, did you have additional questions that were not answered or did you need information that you were unable to obtain?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

INFO-4a. **What were they?**

_____

_____

Decision Making

DM-1. **What was the primary reason that you decided to purchase or upgrade your equipment?** (*check all that apply*) *(FR Survey = #7)*

1. ❑ Remodeling
2. ❑ Cost of repair or maintenance of old unit(s)
3. ❑ Parts availability
4. ❑ Reliability issues of old equipment
5. ❑ Equipment was near or past its projected life❑ Equipment failure
6. ❑ Poor performance of old equipment
7. ❑ Contractor recommendation
8. ❑ Energy or energy cost Savings
9. ❑ Environmental concerns
10. ❑ Got a good deal
11. ❑ Needed more modern, smarter equipment (energy manager systems integration or SmartGrid compatible)
12. ❑ Other: *list them*: _____

Please indicate if the *Duke Energy* incentive is/was a factor in your choice to install the more energy efficient equipment instead of other equipment that may not have saved as much energy.

A. Program assistance/incentive has an influence on our decision, or

B. Program assistance/incentive has no influence at all on our decision

If the *Duke Energy* incentive was a factor in your decision, please indicate how much of an influence

the program

incentive/service had on your energy efficient equipment choice. Please circle the number that best represents

the level of influence the program has on your equipment choice. *(Read 0 and read 10 to customer, only read intermediate ratings if customer asks for clarification)*

The Duke Energy program had no effect on our equipment choice	The Duke Energy program may have had a minor influence on our energy efficient equipment choice.		The Duke Energy program had a positive influence in our selection of the energy efficient equipment		The Duke Energy program was one of the key reasons for the energy efficient equipment choice, but not the most important reason		The Duke Energy program was one of the most important reasons for the energy efficiency equipment choice		The Duke Energy program was the primary reason for the energy efficient equipment choice	
0	1	2	3	4	5	6	7	8	9	10

3. Do you think that you would have or will select the same level of energy efficiency the program <u>information and technical assistance</u> would not have been available to you?

A. No, we would make a somewhat different equipment selection or not do the same project

B. Not sure what we would do

C. Yes, we would make exactly the same equipment choice.

DM-2. **If Duke Energy did not offer an incentive for _____, what would you have installed?** *(FR = #1 and #3)*

a. ❑ I would not have installed anything at this time
b. ❑ I would have installed the same equipment but would have needed to wait longer

DM-3. **How much later do you think you might have waited to make the purchase without the incentive?**

i. Months ___
ii. Years ___
iii. Other: _____

c. ❑ I would have installed _____

DM-4a. **Why would you have chosen that particular piece of equipment?**
_____

DM-4b. **Do you remember whether it was more or less expensive than the equipment you eventually installed? _____**
DM-4c. **Do you remember whether it was of higher or lower efficiency than the equipment you eventually installed?_____**

(Repeat for every type of technology in the project)

DM-6. **Were there other reasons in addition to the incentive that you went with the higher efficiency choice instead of something less efficient?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

DM-6a. *If yes....* **What were the other reasons?**

_____

_____

Application Process

App-1. **Who filled out the program application forms for your company?** *(check all that apply).*

a. ❑ I did
b. ❑ Someone from my company did
c. ❑ The contractor
d. ❑ The salesperson
e. ❑ Someone from Duke Energy
f. ❑ Other: _____

App-2. **Who submitted the completed forms to Duke Energy?**

a. ❑ I did
b. ❑ Someone from my company did
c. ❑ The contractor
d. ❑ The salesperson
e. ❑ Someone from Duke Energy
f. ❑ Other: _____

If they filled it out.

App-2a. **On a scale of 1 to 10, please rate how easy it was for you to understand the application form. Please rate 10 for extremely easy and 1 for extremely difficult.** *(A zero would mean it was too difficult to fill out at all.)*

If they don't recall the application,

App-2b. **I've emailed you a copy of the application form to refresh your memory: Do you remember what part of it was difficult?**

_____

App-3. **Did you have any problems receiving the incentive or having the application approved?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes, App-3a. **Please explain the problem and how it was resolved. Was it resolved to your satisfaction?**

_____

_____

Spillover – Channeling into Other Programs

Ch-1. **When firms have experience with energy efficiency programs or products they sometimes make similar decisions to continue the energy savings in other parts of their business. Has your firm taken advantage of any other Duke Energy's energy efficiency programs as a result of your participation in the Smart $aver® Custom program? If yes, what?**

1. 1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes,

Ch-1a. **What have you done? – get as much detail as possible**._____

Ch-1b. **How much energy or money do you think you have saved as a result?**

Spillover - Electric

Sp-1. **As a result of your participation in Duke Energy's Smart $aver® Custom program, have you made any other electric energy efficiency improvements that do not qualify for any incentive or rebate?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes,

Sp-1a. **What have you done?** – *get as much detail as possible.*

Sp-1b. **How much energy or money do you think you have saved as a result?**

If response provided above,

Sp-2. **Any others?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes,

Sp-2a. **What have you done?** – *get as much detail as possible.*

Sp-2b. **How much energy or money do you think you have saved as a result?**

Improvements

Impr-1. **One of the objectives that the program would like to see over the next year is increased participation of businesses like yours. Can you think of things that the program can do to help increase participation or help increase interest from people like yourself?**

a. ❑ Increase general advertising
b. ❑ Increase advertising in trade media
c. ❑ Present the program in trade or associated meetings
d. ❑ Offer larger incentives
e. ❑ Offer incentives on other items/include other items
f. ❑ Have program staff call small C&I customers
g. ❑ Make the process more streamlined for customers
h. ❑ Make the process more streamlined for contractors
i. ❑ Other: _____

Impr-2. **At any time during your application process, did you need to contact Duke Energy to obtain information, or ask about progress on the application, or to obtain any other help, assistance or information?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes, Impr 2-a. **Were your questions or needs effectively handled by the Duke Energy?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

Impr 2b. **How might this be improved?**

_____

_____

Impr-3. **Overall, what about the Smart $aver® Program works well and why?**

_____

_____

Impr-4. **What doesn't work well and why?**

_____

_____

Satisfaction

We would like to ask you a few questions about your satisfaction with the program. For these questions we would like you to rate your satisfaction using a 1 to 10 scale where a 1 means that you are very dissatisfied with the program and a 10 means that you are very satisfied.

How would you rate your satisfaction with:

Sat-1. **The incentive levels provided by the program**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat-2. **The ease of filling out the participation and incentive forms**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat-3. **The time it took for you to receive your incentive**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat-4. **The number and kind of technologies covered in the program**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat-5. **The technical expertise of Duke Energy staff**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat 6. **The information you were provided explaining the program**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat 7. **Considering all aspects of the program, how would you rate your overall satisfaction with the Smart $aver® Custom Program?**

1 2 3 4 5 6 7 8 9 10

Sat-7a. If score is 8 or less ask: **What could have been done to make your experience better, or have we already covered it?**

_____

Appendix C: Participant Interview Protocol

Name: _____
Company: _____
Title: _____

Hello, my name is _____. I am calling on behalf of Duke Energy. Duke Energy is currently evaluating how well their Smart $aver® Custom program is doing, and your name came up as someone who might be willing to share any ideas you have on how Duke might increase customer participation in the Smart $aver® Custom. Would you be willing to help? I would like do a short interview you that will take about 15 minutes. May I speak with _____ please?

If person talking, proceed. If person is called to the phone reintroduce.
If not free to talk, ask when would be a good time to call and schedule the call-back:

Call back 1: Date: _____, Time: _____ ❑AM or ❑PM
Call back 2: Date: _____, Time: _____ ❑AM or ❑PM
Call back 3: Date: _____, Time: _____ ❑AM or ❑PM
Call back 4: Date: _____, Time: _____ ❑AM or ❑PM
Call back 5: Date: _____, Time: _____ ❑AM or ❑PM
❑ Contact dropped after fifth attempt.

Establishing Questions:

ES-0. **Would you please tell me what your company does, and what your role is in your company?** _____

ES-1. **Our records indicate that you submitted an application to the Smart $aver® Custom Program in <date> and that you either did not or were not able to participate in the program.**

Do you recall submitting the application for this program?

1. ❑ Yes, *begin* — *Skip to Q2.*
2. ❑ No,
99. ❑ DK/NS

1a. **This program was provided through Duke Energy. In this program, Duke Energy provides incentives for companies to install an energy efficient technologies.**

Do you remember submitting an application for this program?

1. ❑ Yes, *begin* → *Go to Q2.*

2. ❑ No,
99. ❑ DK/NS

If No or DK/NS terminate interview and go to next participant.

ES-3. **Please tell me what you remember about the intended project: Did you go ahead and do the project? Is it completed? How long did it take? Why did you decide to undertake the project at that time, rather than sooner or later?**_____

Information-Gathering Phase

INFO-1. **How did you become aware of the Smart $aver® Custom Program?**

i. ❑ Duke Energy sent me a brochure
j. ❑ A Duke Energy representative told me about it
k. ❑ Duke Energy website.
l. ❑ A contractor I was working with told me about the program
m. ❑ An equipment supplier
n. ❑ I saw an ad in _____
o. ❑ Other _____
p. ❑ DK/NS

INFO-2. **At the time you became aware of the program and considered taking advantage of the incentive, did you do any additional investigation to confirm the program's participation requirements and program benefits, or was the information you had enough for you to make a participation decision?**

i. ❑ The information received was adequate
j. ❑ Didn't need to confirm/ already knew about it
k. ❑ Went to the program or Duke Energy web site
l. ❑ Called or emailed a Duke Energy contact
m. ❑ Called or emailed a contractor
n. ❑ Called or emailed an equipment salesperson
o. ❑ Other: _____
p. ❑ DK/NS

If c, d, e, f, g:

INFO-3. **Were you able to get the information you needed about the program's participation requirements and benefits?** *Note: many may have only heard about this through their contractors and thus had minimal involvement, so this question may only apply to a few of them.*

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

INFO-4. **While you were deciding whether or not you wanted to participate, did you have additional questions that were not answered or did you need information that you were unable to obtain?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

INFO-4a. **What were they?**

_____

_____

Decision Making

DM-1. **What was the primary reason that you decided to purchase or upgrade your equipment?** *(check all that apply)*

13. ❑ Remodeling
14. ❑ Cost of repair or maintenance of old unit(s)
15. ❑ Parts availability
16. ❑ Reliability issues of old equipment
17. ❑ Equipment was near or past its projected life❑ Equipment failure
18. ❑ Poor performance of old equipment
19. ❑ Contractor recommendation
20. ❑ Energy or energy cost Savings
21. ❑ Environmental concerns
22. ❑ Got a good deal
23. ❑ Needed more modern, smarter equipment (energy manager systems integration or SmartGrid compatible)
24. ❑ Other: *list them*: _____

DM-1a. **Once you learned you were not able to participate in Smart $aver®, what did you decide to do?**

a. ❑ Installed anyway
b. ❑ Installed later
c. ❑ Delayed indefinitely
d. ❑ Cancelled Project

If DM-1a=Installed anyway,

DM-2a. **What did you have installed?** _____

Repeat the following questions for each measure installed:

DM-2b **Is this the same equipment on your Smart $aver® application?** Y/N_____

DM-2c *If not,* **how is it different?**_____

a. ❑ Price higher
b. ❑ Price lower
c. ❑ More efficient
d. ❑ Less efficient
e. ❑ Other _____

If DM-1a=Installed later.

DM-3a. **When did you install the equipment?** _____
DM-3b. **Why did you decide to install at that time rather than sooner?**
DM-3c. **What did you have installed?**
_____

Repeat the following questions for each measure installed:

DM-3d. **Is this the same equipment on your Smart $aver® application?** Y/N_____

DM-3e. *If not,* **how is it different?**_____

a. ❑ Price higher
b. ❑ Price lower
c. ❑ More efficient
d. ❑ Less efficient
e. ❑ Other _____

If DM-1a=Delayed indefinitely:

DM-4a. **When do you realistically expect the project to start?**
_____
DM-4b. **Why do you expect the project to start then, rather than sooner?**
DM-4c**. What do you plan to install?**
_____

Repeat the following questions for each measure installed:

DM-4d. **Is this the same equipment on your Smart $aver® application?** Y/N_____

DM-4e. *If not,* **how is it different?**_____

a. ❑ Price higher
b. ❑ Price lower
c. ❑ More efficient
d. ❑ Less efficient
e. ❑ Other _____

If DM-1a=Cancelled project.

DM-5a. **Can you please share with me the reasons you cancelled the project?**
_____

Skip DM-6 and DM-7, go to next section.

DM-6. **I would like to ask how important the project cost (or the cost of the initial capital outlay), was in your decision making. Would you say the *project cost* was**… *(read and check the best response).*

a. ❑ The primary deciding factor for selecting the equipment,
b. ❑ One of the more important deciding factors.
c. ❑ An important reason, but not more so than other reasons
d. ❑ One of the reasons, but it was a minor or unimportant reason, or
e. ❑ It was not a reason at all,
f. ❑ DK/NS.

DM-7. **I would like to ask how important the cost of energy (or the ongoing costs of energy usage), were in your decision making. Would you say the energy *cost* was**… *(read and check the best response).*

a. ❑ The primary deciding factor for selecting the equipment,
b. ❑ One of the more important deciding factors.
c. ❑ An important reason, but not more so than other reasons
d. ❑ One of the reasons, but it was a minor or unimportant reason, or
e. ❑ It was not a reason at all,
f. ❑ DK/NS.

_____

_____

Application Process

App-1. **Who filled out the program application forms for your company?** *(check all that apply).*

a. ❑ I did
b. ❑ Someone from my company did
c. ❑ The contractor
d. ❑ The salesperson
e. ❑ Someone from Duke Energy
f. ❑ Other: _____

App-2. **Who submitted the completed forms to Duke Energy**?

a. ❑ I did
b. ❑ Someone from my company did
c. ❑ The contractor
d. ❑ The salesperson
e. ❑ Someone from Duke Energy
f. ❑ Other: _____

If they filled it out.

App-2a. **On a scale of 1 to 10, please rate how easy it was for you to understand the application form. Please rate 10 for extremely easy and 1 for extremely difficult.** *(A zero would mean it was too difficult to fill out at all.)*

If they don't recall the application,

App-2b. **I've emailed you a copy of the application form to refresh your memory: Do you remember what part of it was difficult?**

_____

App-3. **Did you have any problems receiving the incentive or having the application approved?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes, App-3a. **Please explain the problem and how it was resolved. Was it resolved to your satisfaction?**

_____

_____

Spillover – Channeling into Other Programs

Ch-1. **When firms have experience with energy efficiency programs or products they sometimes make similar decisions to continue the energy savings in other parts of their business. Has your firm taken advantage of any other Duke Energy's energy efficiency**

programs as a result of your participation in the Smart $aver® Custom program? If yes, what?

2. 1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes,

Ch-1a. **What have you done?** – *get as much detail as possible.*_____

Ch-1b. **How much energy or money do you think you have saved as a result?**

Spillover - Electric

Sp-1. **As a result of your participation in Duke Energy's Smart $aver® Custom program, have you made any other electric energy efficiency improvements that do not qualify for any incentive or rebate?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes,

Sp-1a. **What have you done?** – *get as much detail as possible.*

Sp-1b. **How much energy or money do you think you have saved as a result?**

If response provided above,

Sp-2. **Any others?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes,

Sp-2a. **What have you done?** – *get as much detail as possible.*

Sp-2b. **How much energy or money do you think you have saved as a result?**

Improvements

Impr-1. **One of the objectives that the program would like to see over the next year is increased participation of businesses like yours. Can you think of things that the program can do to help increase participation or help increase interest from people like yourself?**

a. ❑ Increase general advertising
b. ❑ Increase advertising in trade media
c. ❑ Present the program in trade or associated meetings
d. ❑ Offer larger incentives
e. ❑ Offer incentives on other items/include other items
f. ❑ Have program staff call small C&I customers
g. ❑ Make the process more streamlined for customers

h. ❑ Make the process more streamlined for contractors
i. ❑ Other: _____

Impr-2. **At any time during your application process, did you need to contact Duke Energy to obtain information, or ask about progress on the application, or to obtain any other help, assistance or information?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes, Impr 2-a. **Were your questions or needs effectively handled by the Duke Energy?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

Impr 2b. **How might this be improved?**

_____

_____

Impr-3. **Overall, what about the Smart $aver® Program works well and why?**

_____

_____

Impr-4. **What doesn't work well and why?**

_____

_____

Satisfaction

We would like to ask you a few questions about your satisfaction with the program's offerings. For these questions we would like you to rate your satisfaction using a 1 to 10 scale where a 1 means that you are very dissatisfied with the program and a 10 means that you are very satisfied.

How would you rate your satisfaction with:

Sat-1. **The incentive levels provided by the program**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat-2. **The ease of filling out the participation and incentive forms**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat-3. **The time it took for you to receive notice on whether the application was approved or declined.**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat-4. **The number and kind of technologies covered in the program**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat-5. **The technical expertise of Duke Energy staff**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat 6. **The information you were provided explaining the program**

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make this better?**

_____

Sat 7. **Considering all aspects of the program, how would you rate your overall satisfaction with the Smart $aver® Custom Program's application process?**

1 2 3 4 5 6 7 8 9 10

Sat-7a. If score is 8 or less ask: **What could have been done to make your application experience better, or have we already covered it?**

_____